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Volume 18 September 1949 Number 9

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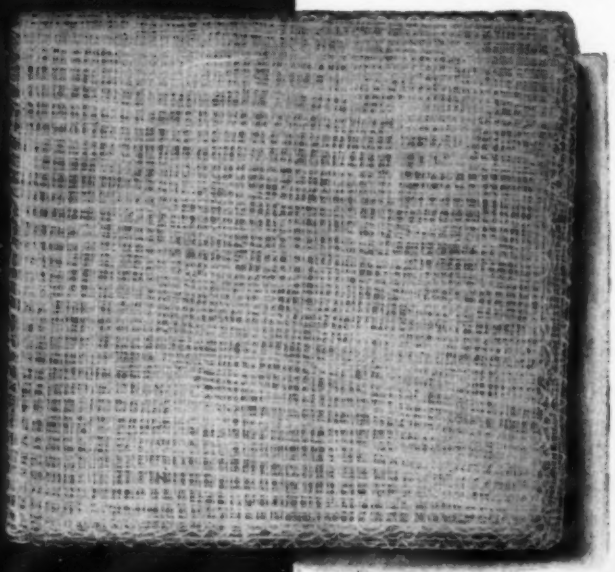

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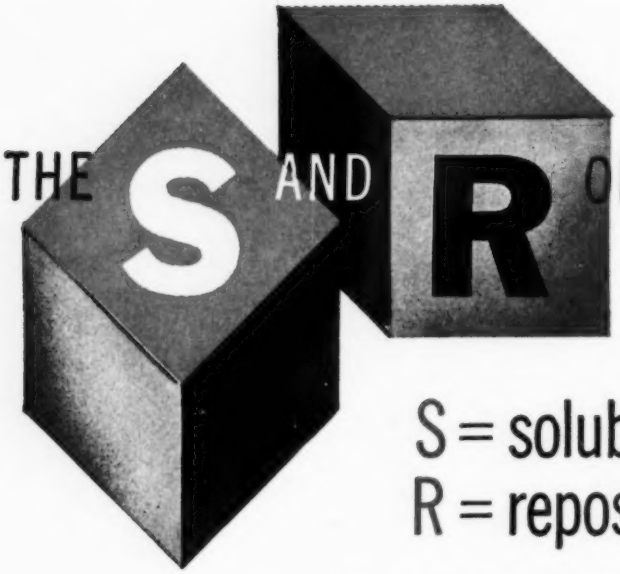

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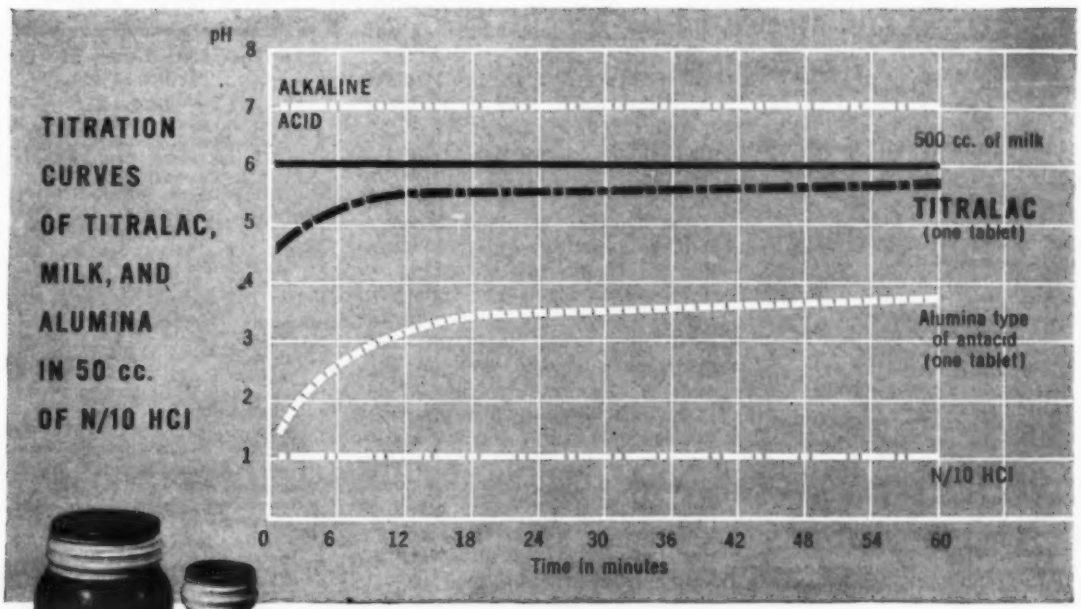

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NEWS

THE JULY 30 issue of *Business Week* magazine gave prominence to an article entitled "Psychiatrists Aid Industry" which commended DR. GEORGE H. GEHRMANN, Medical Director, E. I. du Pont de Nemours & Company, for realizing that manifestations of physical illness are often emotional in origin and sometimes as contagious as smallpox. DR. GEHRMANN engaged DR. FREDERICK W. DERSHIMER as psychiatrist in 1943, and later, DR. GERALD GORDON as his assistant. DR. DERSHIMER'S treatment usually involves only one or two visits as he tackles just the immediate problem. For example, he urges the patient to let his anger flow rather than suppress it. He believes that most persons are ashamed of such emotions as anger, fear, selfishness and self pity and they attempt to destroy them. This is impossible and these base emotions are only driven into dark places in the mind where they build into even higher potentials. Straightening out such situations is extremely important for the productivity of a whole department may be affected by the relationship between boss and subordinate. Further views and plans of DR. DERSHIMER are discussed in the article which also recognizes DR. WILLIAM A. SAWYER, Medical Director, Eastman Kodak Company, who added DR. RALPH T. COLLINS to the staff as a part-time psychiatrist three years ago.

DR. OSCAR A. SANDER, Consultant in Occupational Diseases, and DR. HAROLD A. VONACHEN, Medical Director, Caterpillar Tractor Company, will each present a lecture at the Fourth Annual Postgraduate Course in Recent Advances in Diseases of the Chest, sponsored by the Council on Postgraduate Medical Education and the Illinois Chapter of the American College of Chest Physicians with the cooperation of members of the staffs of the New York medical schools and hospitals, which will be held at the St. Clair Hotel in Chicago, Illinois, September 19 through 23, 1949. DR. SANDER'S address is entitled "Industrial Pulmonary Dust Diseases." DR. VONACHEN will speak to the group on the subject of "Medico-Legal Considerations of Cardiac and Pulmonary Disease."

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1. Mayer, L. L.: Arch. Ophth. *39*:232, 1948.
2. Thygeson, P., in discussion on Mayer, L. L.: Arch. Ophth. *39*:232, 1948.

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THE NEW officers of the A.M.A. Section on Preventive and Industrial Medicine and Public Health, elected at the Annual Meeting at Atlantic City, June 9, are as follows: Chairman, CARL N. NEUPERT, M.D., Madison, Wisconsin; Vice-Chairman, RUTHERFORD T. JOHNSTONE, M.D., Consultant to Industry, Los Angeles, California; and Secretary, JEAN S. FELTON, M.D., Medical Director, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

ROBERT M. BROWN, Chief, Industrial Health Section, Health Division, St. Louis, Missouri, on July 1, 1949, became associated with the Institute of Occupational Medicine and Hygiene of the Department of Public Health, Medical School, Yale University, as Instructor in Public Health (Occupational Medicine).

THE Territorial Association of Plantation Physicians will hold its annual meeting November 17-20, 1949 in Honolulu. DR. LEONARD J. GOLDWATER, Professor of Industrial Hygiene at Columbia University, New York, New York will head a panel on heart disease in industry. Other features of the meeting will be discussions entitled "Industrial Applications of Preventive Medicine" and "Nuclear Physics and the Effects of Radiation on the Human Body." A clinic on industrial problems will also be included in the program. Physicians from the Mainland who are planning to visit Hawaii in November are urged to attend.

THE PROGRAM for the Second Gulf Coast Regional Conference on Industrial Health to be held October 6-7, 1949 at the Rice Hotel in Houston, Texas, has been announced. The following addresses will be included: "Industrial Health Programs Pay Dividends," MANFRED BOWDICH, Director of Health and Safety, Lead Industries Association, New York City; "Present Status of Industrial Toxicology and Its Application," ALLAN J. FLEMING, M.D., Assistant Medical Director, E. I. du Pont de Nemours and Company, Wilmington, Delaware; "Control of Environmental Industrial Health Hazards," ALLEN D. BRANDT, M.D., Industrial Hygiene Engineer, Bethlehem Steel Company, Bethlehem, Pennsylvania; "Industrial Health in an Atomic Era," speaker to be announced; "Employers Liability for Occupa-

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62nd Annual Meeting, April 4-6, 1950, at the Drake Hotel, Chicago

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American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W., Washington 5, D.C.

American Association of Industrial Nurses, 654 Madison Ave., New York 21, N.Y. GLADYS L. DUNDORE, R.N., Executive Secretary.
April 23-29, 1950, Chicago.

American Chemical Society, 1155 Sixteenth St., N.W., Washington 6, D.C. A. H. EMERY, Secretary.

American College of Physicians, 4200 Pine St., Philadelphia 4, Pa. E. R. LOVELAND, Secretary.

American College of Surgeons, 40 East Erie St., Chicago 11, Ill.

tional Diseases," speaker to be announced; "Medical and Safety Aspects of Some Heavy Metals," SHERMAN S. PINTO, M.D., American Smelting and Refining Company, Denver, Colorado; "The Role of the Nurse in the Industrial Health Program," F. RUTH KAHL, R.N., United States Public Health Service, Washington, D. C.; "Industrial Waste and Stream Pollution Abatement Activities," speaker to be announced; "Public Health Aspects of Atmospheric Pollution," H. H. SHRENK, Scientist Director Chief, Environmental Investigations Branch, U. S. Public Health Service; "Safe Use of Common Chemicals in the Plant and in the Home," D. D. IRISH, M.D., The Dow Chemical Company, Midland, Mich; and "Management's Responsibility for Pre-Paid Medical and Hospital Plans," GENERAL PAUL R. HAWLEY, M.D., Blue Cross and Blue Shield Commission, Chicago, Illinois.

TO HELP meet the employment problems of the cerebral palsied and other severely handicapped, a special training course for employment and placement counselors will be held Nov. 7 to Dec. 7, 1949 in New York under the sponsorship of Alpha Gamma Delta, women's sorority, and the National Society for Crippled Children and Adults.

Stop Order

THE FOLLOWING issues of INDUSTRIAL MEDICINE requested in the June and July issues are no longer in demand and the offer to pay for these issues is hereby rescinded: Oct., 1941; Nov., 1942; July, 1945; March and Oct., 1946; March, May, Sept., Nov., 1947; Jan., Sept., Nov., 1948; and Jan., 1949.

American Conference of Governmental Industrial Hygienists, U.S. Public Health Service, Washington, D.C. J. J. BLOOMFIELD, Secy-Treas.
April 23-29, 1950, Chicago.

American Industrial Hygiene Association, 4400 Fifth Ave., Pittsburgh 13, Pa. HENRY F. SMYTH, JR., Executive Secy.
April 23-29, 1950, Chicago.

American Medical Association, Council on Industrial Health, 535 North Dearborn St., Chicago 10, Ill. CARL M. PETERSON, M.D, Secretary.

American Public Health Association, 1790 Broadway, New York 19, N. Y. REGINALD M. ATWATER, M.D., Executive Secretary.
November 8-12, 1949; Boston.

Association for the Surgery of Trauma.

Canadian Public Health Association, Vancouver, B.C., Canada.

Council on Industrial Health, American Medical Association; Secretary: CARL M. PETERSON, M.D., 535 N. Dearborn St., Chicago 10.

Industrial Hygiene Foundation of America, 4400 Fifth Ave., Pittsburgh 13, Pa. JOHN F. MCMAHON, Managing Director.
November 16-18; Pittsburgh.

International Association of Industrial Accident Boards & Commissions. MARSHALL DAWSON, U.S. Dept. of Labor, Washington, D.C., Secretary-Treasurer.
September 12-18; New York.

Lead Industries Association, 420 Lexington Ave., New York 17, N.Y. ROBERT L. ZIEGFELD, Secretary-Treasurer.
November 15-16; Chicago.

National Council on Rehabilitation; Secretary-Treasurer: MR. HOLLAND HUDSON, 1790 Broadway, New York 19.

National Metal Congress, Philadelphia.
October 25-28; Philadelphia.

National Rehabilitation Association, 411-7th Ave., Nashville 4, Tenn. LOUIS R. SCHUBERT.

National Safety Council, 20 North Wacker Drive, Chicago 6, Ill. NED H. DEARBORN, President; CARMEN FISH, Secretary.
October 18-22; Chicago.

National Tuberculosis Association, 1790 Broadway, New York 19, N. Y. H. STUART WILLIS, Secretary.

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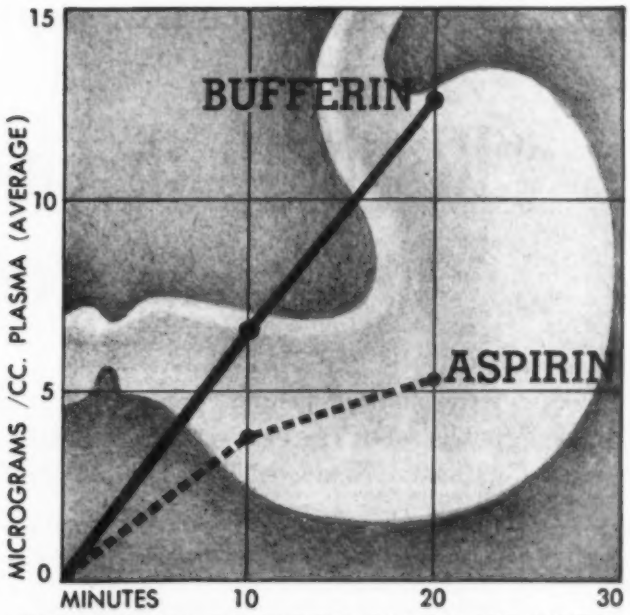

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"Results with Chlorophyll Therapy in 40 Cases of Dermatoses"

Excerpts from a clinical paper by W. D. Langley, M. D., and W. S. Morgan, M. D., published in The Pennsylvania Medical Journal, 51:44, 1947. This clinical investigation was conducted in the Guthrie Clinic and Robert Packer Hospital, Sayre, Pa.

The following synopsis provides physicians a convenient review of the clinical experience of Drs. Langley and Morgan with Chloresium chlorophyll therapy in the treatment of acute and chronic dermatoses. It quotes their reasons for undertaking the investigation . . . describes the subjective and objective effects of the treatment . . . and summarizes the final results. This report is one of an extensive series of published papers on Chloresium chlorophyll therapy; reprints are available on request.

Why this investigation was undertaken

"Following the recent experimental work on water-soluble chlorophyll proving it to be a tissue stimulant which resulted in the suggestion that this drug might be found of value in the treatment of osteomyelitis, burns, and chronic ulcers, it was thought worthwhile to employ this substance in a series of such cases in an attempt to corroborate clinically the experimental findings. It was while this series† was in progress that we first became aware of the value of water-soluble chlorophyll* in the treatment of certain dermatoses . . .

"Chlorophyll (Chloresium) was used more or less in desperation when other measures had failed to relieve the subjective symptoms and objective manifestations of several cases of dermatoses of varied type. We knew from our own previous experience and from the literature that chlorophyll was bland in its effect on the skin. We did not anticipate in any measure, however, the degree of beneficial effect produced by chlorophyll . . .

Selection of cases and controls

"During a period of six months, from February to July, 1946, we treated 40 dermatologic cases, the majority of which had proved highly resistant to all previous treatment (see Table) . . .

"Eight patients having bilateral involvement were used as control cases. In each instance one extremity showed decided improvement upon treatment with water-soluble chlorophyll, whereas signs and symptoms persisted as before in the extremity treated with substances other than chlorophyll, such as Burrow's solution, Calamine lotion, starch baths, and boric acid ointment or compresses.

"Five cases were treated with the water-soluble ointment base alone, but were not improved. These later responded to chlorophyll therapy.

Relief of itching and burning

"One of the most gratifying results of treatment with water-soluble chlorophyll was its ability to relieve itching and burning. This effect was observed almost immediately and was usually sustained for ten or twelve hours after the initial applications.

Objective results

"The objective response seen over the involved areas proved to be no less dramatic than the palliation of symptoms aforedescribed. In many of the acute cases, areas which were highly erythematous, swollen, and weeping before application of water-soluble chlorophyll ointment were found to be greatly improved within ten to twelve hours. The absence of oozing after this period of time was most impressive. . . . Skin tenderness which in some of our cases had been severe was relieved overnight . . .

†The favorable findings from this study were presented (in a report "Treatment of Chronic Ulcers with Chlorophyll," in the Am. J. Surgery, April, 1948.)

*The water-soluble chlorophyll preparations used in this study were supplied by Rystan Company, Inc., Mt. Vernon, N. Y. They are marketed under the name "Chloresium" Solution [Plain] and Ointment.

SUMMARY TABLE

Diagnosis	No. of Cases	Duration	Previous Treatment	Results from Water-Soluble Chlorophyll Ointment	Statistics and Healing Time
Contact dermatitis	8	Two weeks to eighteen months	Cold boric acid and starch wet dressings; calamine lotions	Relief of itching in all cases; progressive objective improvement; decreased weeping, erythema, edema in acute cases; in chronic type, there was softening of skin and loss of lichenification; removal of crusts	All cases clinically cured: 5 within 10 days, 2 within 2 weeks, 1 within 1 month
Stasis dermatitis	13	One to eighteen months	Cold boric acid and starch wet dressings; penicillin ointment and bland ointments	Relief of itching and burning in all cases; progressive objective improvements	12 cases clinically cured: 6 within 10 days, 5 within 3 weeks, 1 within 6 weeks. No objective improvement in 1 case
Neurodermatitis	5	Three to eighteen months	Cold boric acid and starch wet dressings; x-rays, ultraviolet radiations, and bland ointments	Relief of itching and burning in all cases; diminished erythema, weeping, edema, crusting	All cases showed sustained improvement; 3 cases clinically cured within 2 weeks; 2 cases showed much improvement
Seborrheic dermatitis	3	Two weeks to one year	Cold wet dressings; penicillin ointment (one case, no previous treatment)	Relief of itching; diminished erythema, edema, weeping, crusting	All cases clinically cured within 2 weeks; 1 case within 2 days
Exfoliative dermatitis	2	Twelve to eighteen months	Zinc oxide; penicillin ointment; cold wet dressings	Diminished erythema, edema, weeping, scaling, crusting	Both cases clinically cured: 1 case within 2 weeks
Infantile eczema	2	One to three months	Boric acid ointment and penicillin ointment	Relief of itching; diminished erythema, weeping, crusting	Both cases clinically cured: 1 case within 1 week
Sycosis vulgaris	3	Two weeks to eight years	Penicillin ointment; x-rays	Relief of itching; diminished erythema, weeping, crusting	2 cases improved; 1 showed no objective improvement
Pyogenic fungus	1	Six months	Local applications of unknown type	Good	Healed in 7 days
Nummular eczema	1	Six months	Local applications	Poor	None
Psoriasis	1	Twelve years	Numerous local applications	Good symptomatic relief	No effect on lesions in 30 days
Moniliasis of vulva	1	Three years	X-ray therapy; estrogens; antipruritic application	Relief of itching and burning; was dramatic in 48 hours	Almost complete healing in 2½ mos.

"In no patient in this series of dermatologic problems treated with water-soluble chlorophyll has there been any evidence of toxicity or allergic reaction."

CONCLUSIONS

"Of 40 cases treated with water-soluble chlorophyll (Chloresium), all experienced relief of itching and burning. Thirty-six cases or 90 per cent showed decided improvement objectively. Four or 10 per cent were not improved.

"Of the 36 cases showing response to treatment with chlorophyll, 32 or 88.8 per cent have been completely relieved of the present attack. Four continue to improve under chlorophyll therapy.

"Of the 40 cases, 31 or 77.5 per cent had been active for one month or longer. Nine cases varied in duration from one to three weeks."

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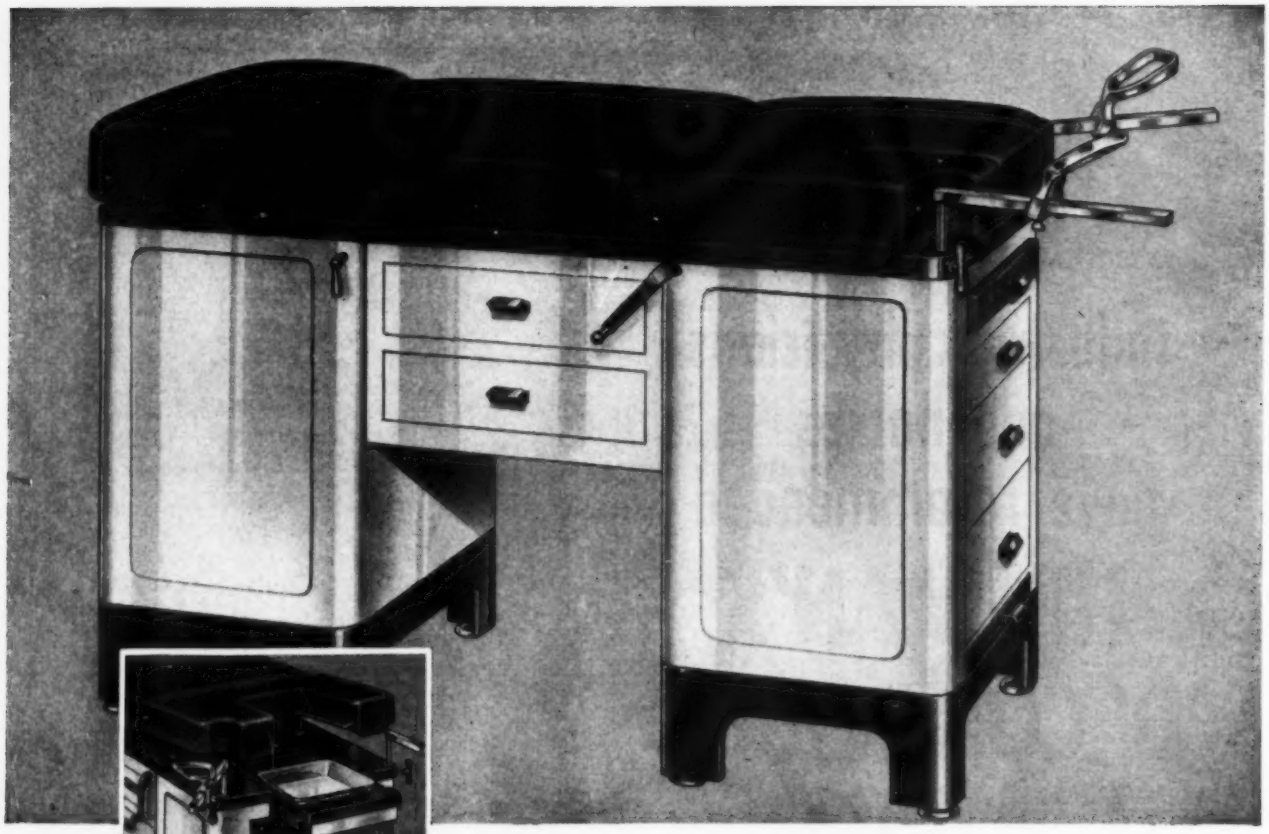

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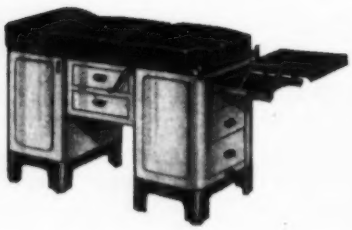

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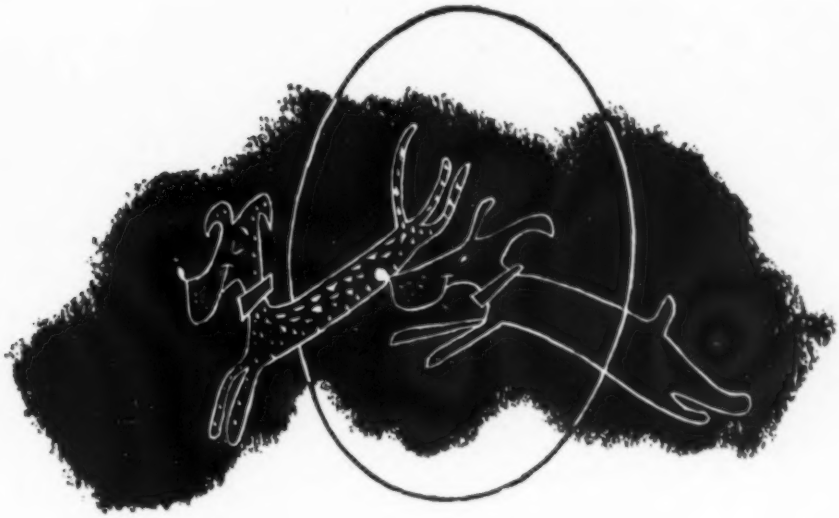
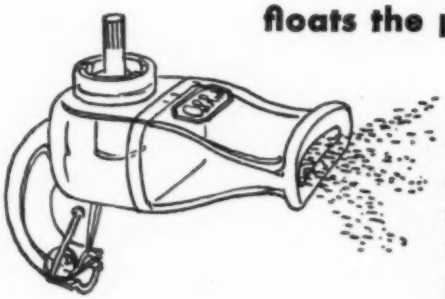


The Aerohalor's

WIDE OPENING

floats the penicillin powder on through the mouth



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1. Krasno, L., Karp, M., and Rhoads, P. S. (1948), The Inhalation of Penicillin Dust, J. Amer. Med. Assn., 138:344, October 2.

**Trade Mark for Abbott Sifter Cartridge. Aerohalor and Aerohalor Cartridge patented in U. S. and foreign countries.*

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*Neo-Antergan is the registered trade-mark of Merck & Co., Inc. for its brand of pyranisamine.

1. Brewster, J. M., U. S. Naval Med. Bull. **49**: 1-11, January-February 1949.

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Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154; Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60; Proc. Soc. Exp. Biol. and Med., 1934, 32-241; N. Y. State Journ. Med., Vol. 35, 6-1-25, No. 11, 590-592.

Adequate Breakfast Habits

AND MENTAL ACUITY

Recent physiologic research* conducted at the Departments of Physiology and Nutrition of an outstanding medical college has demonstrated a positive correlation between breakfast adequacy and mental acuity at the pre-noon hour. By inducing greater physiologic efficiency, breakfast routines providing 800 or 400 calories reduce the simple and choice reaction times to external stimuli whereas the habits of omitting breakfast or the taking of coffee only produce the opposite effect.

The effects of the four different breakfast practices were studied under strictly controlled conditions using six young women graduate students as subjects. Since reaction time is particularly sensitive to alterations in physiologic conditions, this test was adopted for detecting changes in the mental acuity states of the experimental subjects. The findings of the 800 calorie breakfast period were adopted as the standard base of reference.

Conclusions drawn from this important work are:

1. When no breakfast was the morning practice, a notable *increase* resulted in the duration of the simple and choice reaction times.

2. Habituation to coffee only induced a similar *increase* in reaction time.

3. When habituation to the 400 calorie breakfast was attained after the coffee only period, both simple and choice reaction times showed a noteworthy *decrease*.

This physiologic research, for the first time, presents directly derived experimental evidence supporting the recommendation long propounded by nutrition and health authorities for eating an adequate breakfast. For planning such nutritionally acceptable breakfasts the widely acclaimed basic breakfast pattern of fruit, cereal, milk, bread and butter serves as an excellent nutrient foundation.

Although not stated in the published report, the findings forcefully intimate that during the late morning greater mental acuity results from adequate breakfast practices than when omission of breakfast or coffee only is the morning habit.

The presence of this seal indicates that all nutritional statements herein have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.

*Reprint of the research findings referred to will be sent on request.

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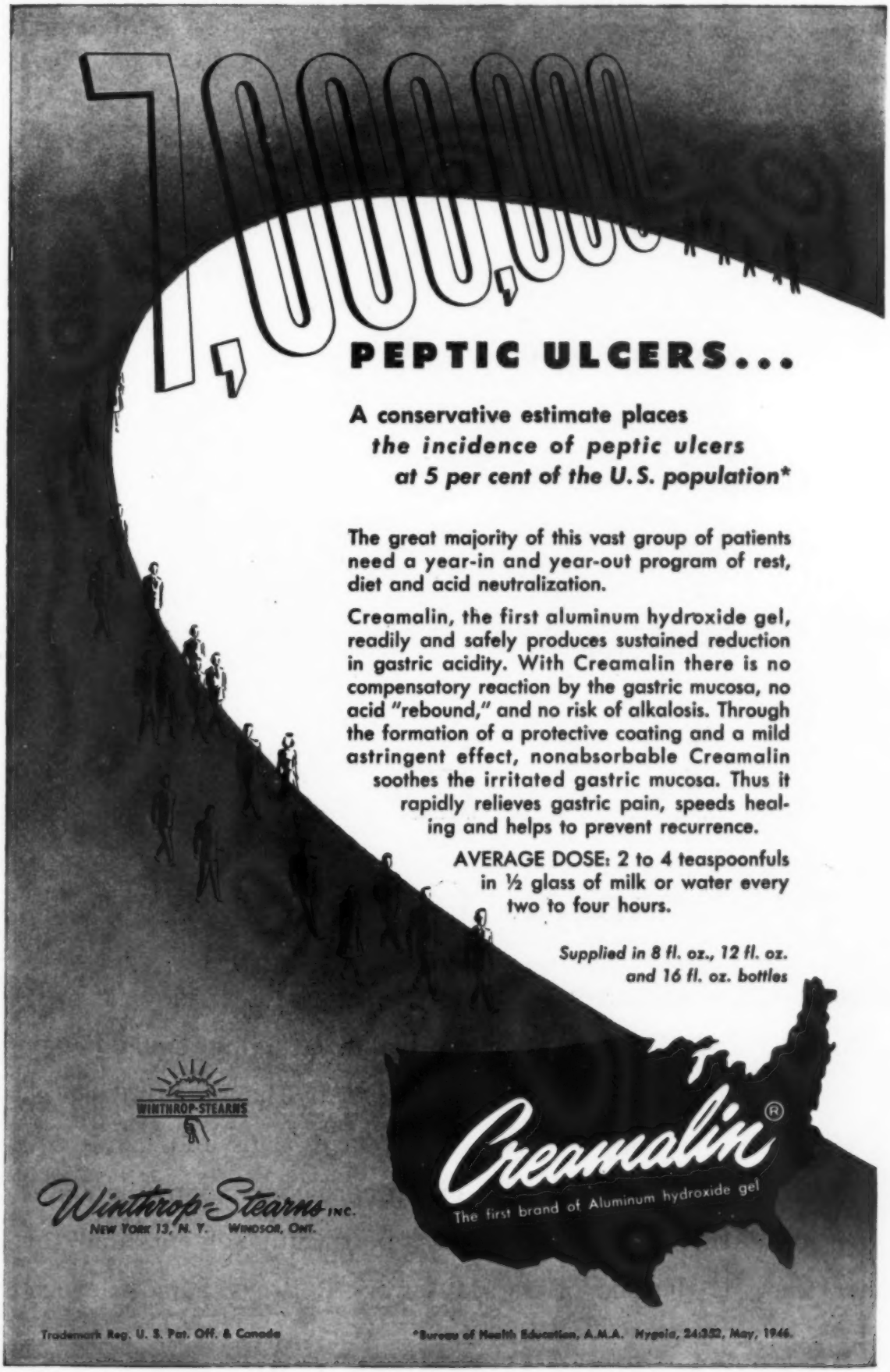
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Supplied in 8 fl. oz., 12 fl. oz. and 16 fl. oz. bottles
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The first brand of Aluminum hydroxide gel
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*Bureau of Health Education, A.M.A. Hygeia, 24:352, May, 1946.

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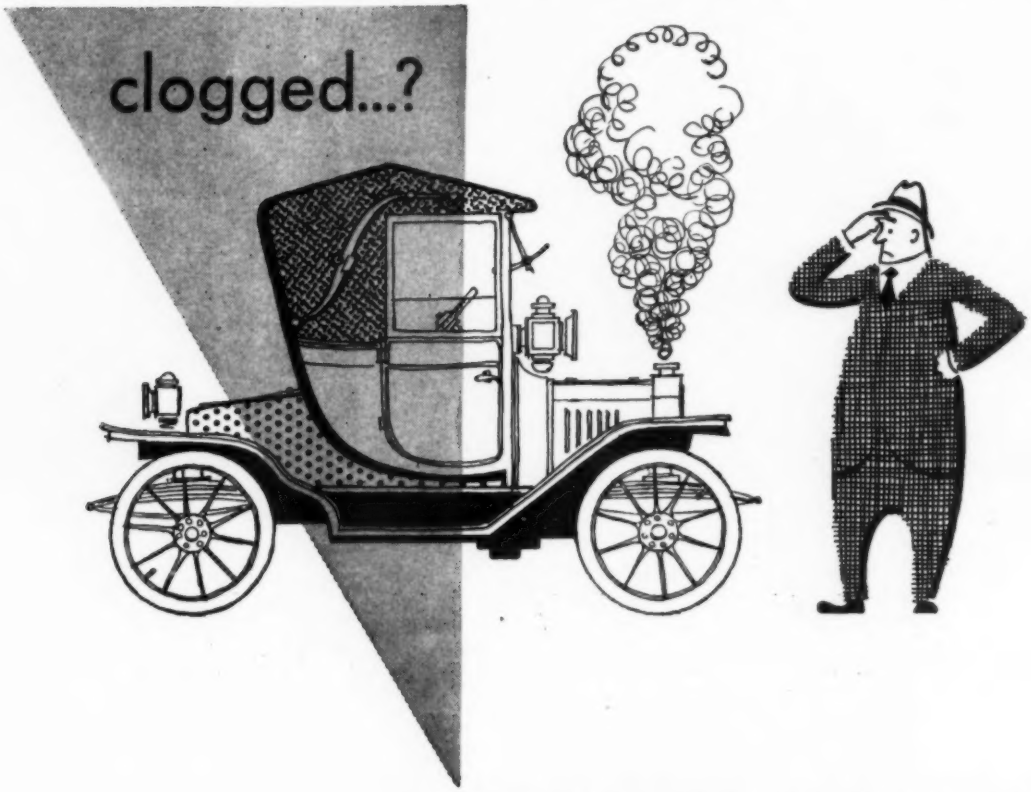

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INDUSTRIAL MEDICINE AND SURGERY

Volume 18 SEPTEMBER 1949 *Number 9*

The 1949 General Motors Medical Conference

J. M. ROCHE,
Director of Personnel & Public Relations,
Cadillac Motor Car Division,
General Motors Corporation,
Detroit

ON BEHALF of the Central Office and the Detroit Divisions of General Motors Corporation, it is my privilege to welcome you to this 11th General Motors Medical Conference. This meeting today is the first of a series to be held this week, devoted to the consideration of industrial health problems. I am sure today's program will be interesting and beneficial to everyone, and the program for the remainder of the week should be most constructive. I believe meetings of this kind are essential to the continued progress of our health program in General Motors. In our great organization we have almost every kind of industrial activity, and in these varied operations encounter almost every kind of industrial health problem. The opportunity afforded by these periodic conferences to exchange ideas, discuss mutual problems, and develop new plans and procedures contributes a great deal to the accomplishment of our objectives in this field.

General Motors is an acknowledged leader in the science of industrial medicine. This reputation has been earned by each of you and the members of your staffs in all of our plants. The excellent manner in which you have carried this important responsibility has won for us not only

TOP ROW: K. Smith; K. J. Long; R. L. Johnston; M. M. Shafer; E. B. Cudney; R. W. Parr; J. H. Couch; R. A. Young; L. J. Berg; G. A. Eadie; G. Sudimack; E. J. Nugent; J. Jameson; C. C. Coady O. J. Preston; H. F. Kipping; H. Gay; E. Place; T. L. Hazlett; N. E. Leyda

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THIRD ROW: F. Barkman; G. Paul; C. M. Bonzey; J. M. Kimmich; R. Bell; D. T. Mould; F. V. Kowals; W. F. Hickman; G. H. McDonald; F. Ferlaino; A. R. Sirna; J. H. Ganschow; V. T. Williams; J. S. Lambie; F. Irwig; R. A. Kehoe; R. Hussey

SECOND ROW: F. A. Patty; J. R. VanderRoest; S. D. Steiner; P. J. Kunderman; J. G. Cunningham; A. B. Thompson; C. O. Sappington; Wm. B. Cullinan; E. Wolff; J. B. Cooley; S. R. DeMeter; R. M. Baldwin; J. V. Williams; J. P. Baker; M. P. Benoit

BOTTOM ROW: E. F. Lutz; R. B. Robson; F. M. Apfelbaum; J. D. Kelly; E. DeJongh; P. B. Rastello; E. A. Irvin; F. S. Parney; Wm. M. Walker, Jr.; C. D. Selby; J. G. Townsend; T. A. Lloyd-Davies (England); A. R. Thompson (England); C. M. Peterson; A. F. Lecklider; R. Maddox; H. F. Vaughan; J. G. Molner

our position of leadership, but even more importantly the confidence of our employees in the administration of this program. The executives of General Motors share with you the pride we may justly take in our accomplishments in this field.

While our meeting this morning is open only to General Motors people, I am sure that if we invited everyone who would like to attend, we couldn't handle the crowd. I say this because of the steady stream of visitors from other companies and industries seeking advice and information as to our methods of operation. This is a splendid tribute to the work you are doing, and is tangible evidence of the high regard in which it is held by your own profession and industry in general.

THE maintenance of health and good industrial hygiene has been accepted as a management responsibility in every General Motors Division. Management's attitude toward these problems has been positive and constructive. These facts have been most helpful to those of us who have been working at first hand with the problems in the plants. As a result of a progressive management attitude, we have been provided with excellent facilities for carrying on these activities. It is our responsibility to make certain that we are utilizing these facilities to the best advantage. Our routine work is being handled most efficiently, and we have certainly made great progress in the methods and types of examinations and the treatment of occupational diseases. Good facilities manned by competent personnel will enable us to maintain and extend our good work in this area, so as to insure continued progress.

Substantial as has been our progress in the past, I am sure you will agree we have almost unlimited possibilities for the future. It is my opinion that the next important development in industrial medicine is going to be in the contribution it can and should make to employee morale and good employee relations. Everyone knows that an individual who is physically ill is not a good employee. When we recognize a physical problem, we try to do something about it. We can suggest treatment, proper placement, rest, or whatever other measure might be required to correct the condition. We also know that an individual who is temperamentally unfit for his responsibilities will not be a good employee. We recognize that a person subject to emotional disturbances is usually a problem employee; yet in spite of our knowledge of these facts, much remains to be done to find satisfactory solutions to these problems. It is in this area that I think our medical service can make a substantial contribution to the effectiveness of our business.

As time goes on, I believe we must utilize more and more the skills and facilities of our Medical Departments in the solution of many personnel and human relations problems. As economic conditions become stabilized, we shall have an opportunity to build in industry the good employee relations and morale required if General Motors is to continue to progress. That is the challenge for the future, and I am confident that industrial medicine can and will play an important part in meeting it. In the past we have counted the gains of our medical program in terms of such things as improved efficiency, higher morale, reduced absenteeism, reduced workmen's compensation costs, etc. In the future, I am sure that we shall also see increased benefits in improved industrial undertaking.

We have made rapid progress, particularly during the past 10 years. However, we still have a long way to go. I am sure this meeting today and the ones which will follow this week, under the auspices of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, will help point the way toward continued progress in the accomplishment of our objectives.

[NOTE: The 11th General Motors Medical Conference was held at Detroit on Monday, April 4, 1949, immediately preceding the 34th Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS. The following pages, 355-398, contain the G. M. Conference presentations.]

Heart Disease and Continued Employment

D. S. SMITH, M.D.,
Consulting Cardiologist,
and
J. S. LAMBIE, M.D.,
Medical Director, Fisher Body Division,
Pontiac, Michigan

TEN YEARS ago a group of Fisher Body Division employees at Pontiac were examined to try to assess their fitness for continued employment. Routine x-rays of the chest had been taken on these men. Many had electrocardiograms taken at that time and all were given a careful physical examination. We thought it would be interesting now to review those cases and try to discover what the actual prognosis was and the incidence of disability in employees with known heart disease. We have no desire to report a statistical study, but to present several cases which are illustrative of certain types of heart disease.

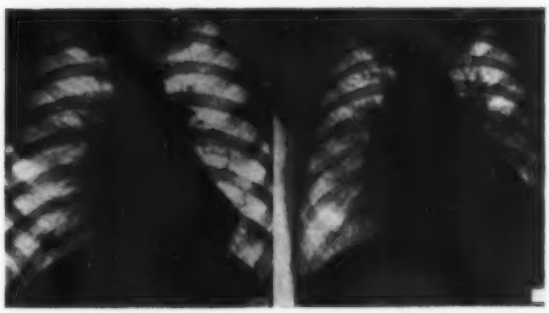
Heart disease in employees falls into one of four groups, the largest being the hypertensives, the next being those with coronary sclerosis, the third, rheumatic heart disease, and, probably the least prevalent today, luetic heart disease. Certainly there are a large number of men with far advanced atherosclerosis and coronary disease who have not come to our attention. These cases would undoubtedly make up the bulk of cases resulting in sudden death. The group we have been concerned with are those with heart disease without high grade disability and toward whom we have been inclined to look with question as to their employability. We shall present illustrative cases and try to give some of the conclusions we arrived at in reviewing all the cases seen. The first two cases were luetic.

CASE 1: H.H., age 55 in 1939, Doorhanger, first employed in 1934, was observed by the Medical Department carefully from 1934 until his death. His history was negative. In 1939 he was noted to have a positive Kahn, and examination of his heart revealed an abnormal aortic 2nd sound compatible with a luetic aortitis. B.P. was 160/84 and 190/110. E.K.G. was not definitely abnormal. X-ray of the chest showed gross widening of the mediastinum from 1939 through 1947. He worked until August 3, 1948, and died August 16, 1948, of a cerebrovascular accident at the age of 64. This man was a rather uncooperative, imbibing, tobacco-chewing type of person who never followed any advice but seemed to live out a fairly normal span of life.

1938 1947

Fig. 1. Case 1

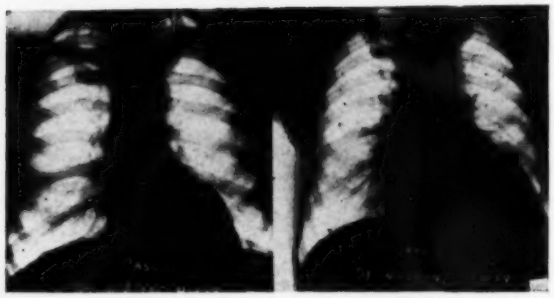
CASE 2: J.T., Inspector, age 66, employed in 1927, was observed in the Medical Department from 1938 up until the present time. He was noted to have a positive Kahn in 1938, along with a marked cardiac arrhythmia. His B.P. was 164/86. X-rays in 1938 showed a slight enlargement of the heart progressing slowly over 11 years until the time of the present x-ray with gross cardiac enlargement. In January, 1945, he decompensated and had 46 days off work. In December of the same year he had 21 days of sick time. In January, 1948, he was off 11 days. At present he has a hypertension of 195/110, a grossly enlarged fibrillating heart clinically, without definite signs of failure. His E.K.G. shows auricular fibrillation only. He is at work every day. This case demonstrates the unpredictability of auricular fibrillation as a cardiac defect so far as continued working is concerned.



1938 1949

Fig. 2. Case 2

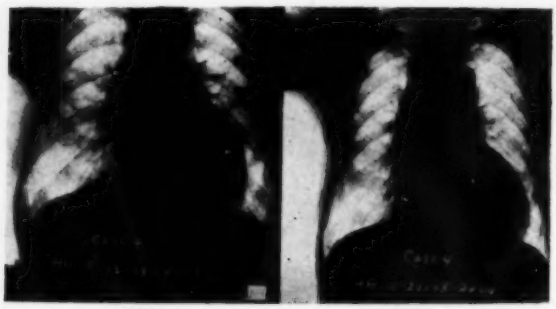
CASE 3: D.Y., Stockman, born 1883, employed in 1934. This man had no complaints. In 1936 his B.P. was 170/100; in 1938, 224/140; in 1940, 230/130; and in 1942, 206/140. E.K.G. in 1939 showed evidence of myocardial damage compatible with hypertension. X-rays show progressive enlargement. In 1943 he died of cardiac failure. This case demonstrates a period of six years of employment with a severe hypertension and a short period of disability.



1938 1942

Fig. 3. Case 3

CASE 4: H.G., Pressroom Inspector, born in 1884, employed in 1924. This man had a B.P. of 212/102 in 1936 and it varied from 160/80 to 240/90 over the succeeding years. History was negative except for marked longevity in both his



1938 1948

Fig. 4. Case 4

parents. E.K.G. in 1938 showed pronounced left axis deviation with T wave changes probably resulting from hypertensive heart disease. X-rays show rather marked enlargement from 1938

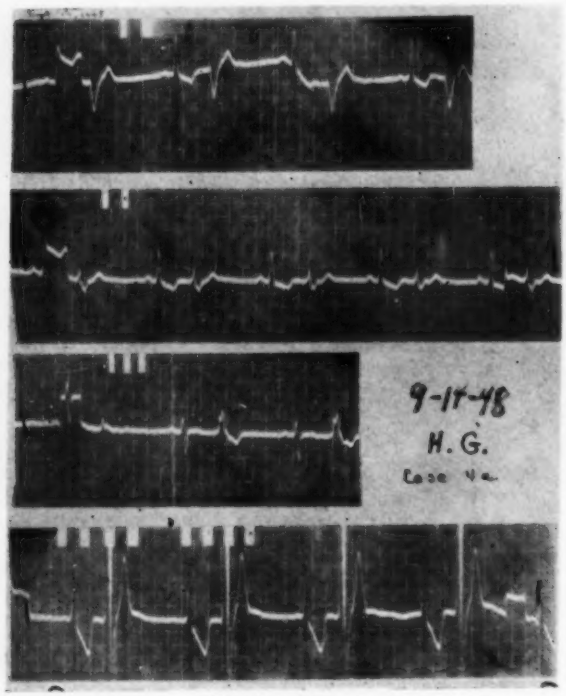
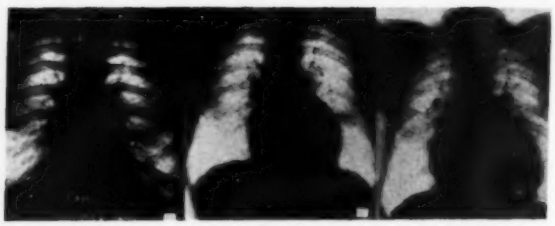


Fig. 4-a. Case 4

until 1948. E.K.G. shows, in 1948, evidence of myocardial hypertrophy with digitalis intoxication. Today at 65 he is still at work. This case demonstrates the unpredictability of some cases of hypertension plus the fact that with a marked desire to work these men are often able to carry on long past when we would think they could. Many of these need special assignments.

CASE 5: C.B., Maintenance Welder, born in 1896, employed in 1928. History on this man was negative other than for a period of congestive heart failure in 1944. At that time the E.K.G. showed myocardial damage with left bundle branch block. The x-ray tells the story on him, showing progressive enlargement from 1938 to 1947. This man worked on December 10, 1947,

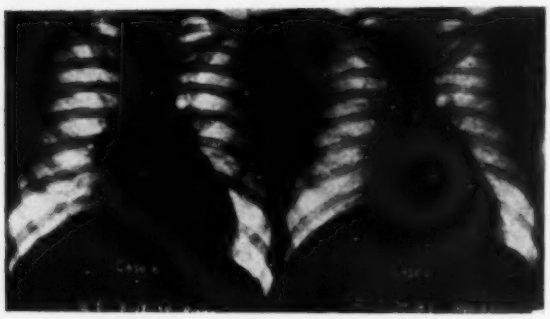


1938 1945 1947

Fig. 5. Case 5

and died after work that day. From review of this case it appears that the rheumatic heart disease was present for a long time, and the progressive enlargement points out the increasing failure developing over the years. The short disability period has been found in many of the cardiacs under our observation.

CASE 6: E.E., Sprayman, born 1906, employed in 1925. This man had an attack of rheumatic fever in 1936 with the onset of auricular fibrillation. A mitral lesion was noted at that time. In 1939 an E.K.G. showed auricular fibrillation but no axis deviation. X-rays show en-



1938 1948

Fig. 6. Case 6

largement in 1938 but less in 1942, and not much increase in 1948. He is still fibrillating. He is at work today. This man demonstrates the need for close cooperation between the cardiologist and the industrial physician and the need for considering each case on its own merits and with close yearly follow-up x-rays.

1938 1943

Fig. 7. Case 7

CASE 7: A.S., Inspector, born 1882. Employed in 1924, and was observed in 1938 to have a blood pressure of 250/140 with a pulse of 96. His past history was negative. His E.K.G. in 1939 showed marked evidence of myocardial changes in left axis deviation and inverted T waves in leads I and II. His X-rays showed definite progressive enlargement from 1938 through 1943. In August, 1944, he died of heart disease. This man had a malignant hypertension at age 56 and cardiac enlargement; yet he was able to work for six years under observation, even up to a few months before his death. The amazing thing about this man was his dogged determination to work and to deliver a good day's work.

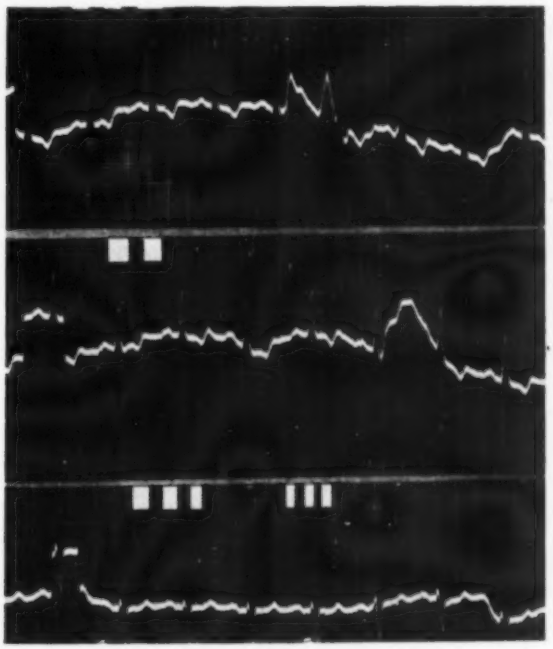
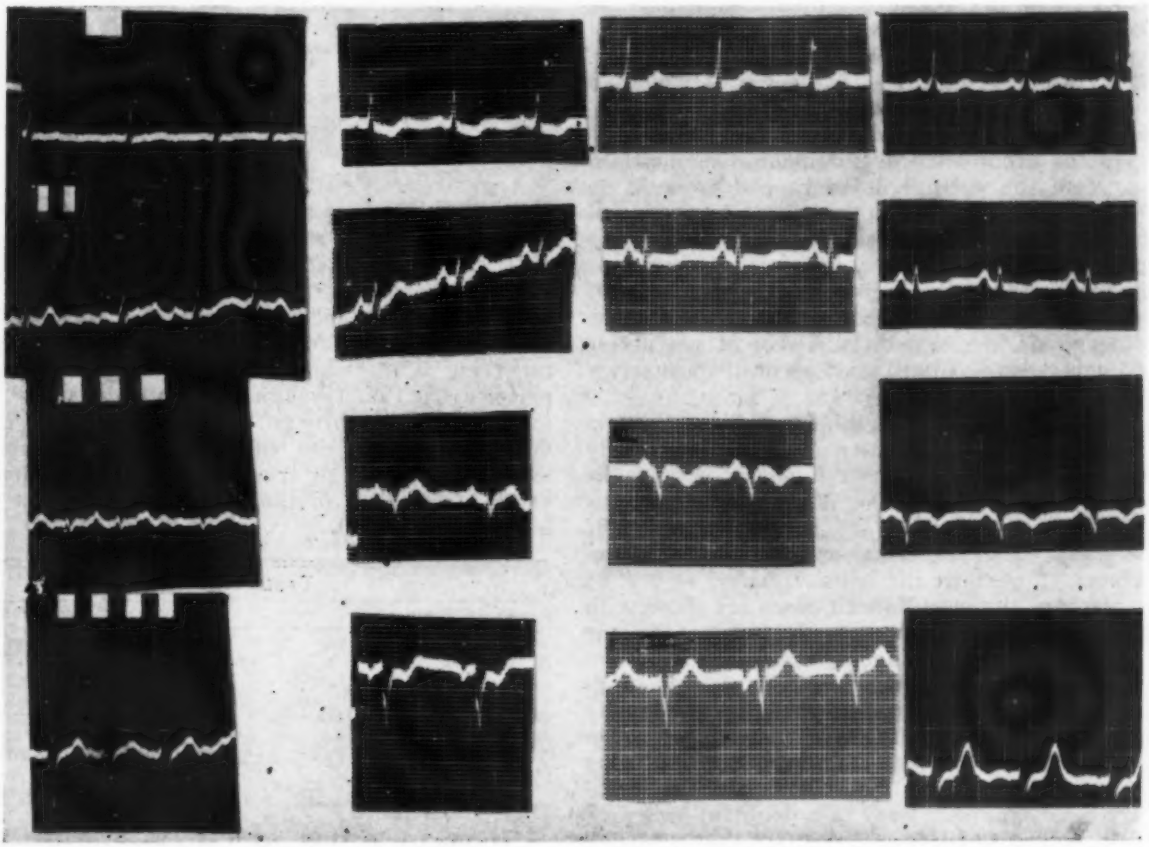


Fig. 7-a. Case 7
3/15/39. Heart rate = 100/min. Marked inversion of T waves in leads I and II. Moderate left axis deviation. Curve is indicative of myocardial changes. No evidence of coronary infarct. Dr. D. Smith



3-25-39 12-20-40 12-24-40 2-14-49

Fig. 8. Case 8

CASE 8: R.K., Plant Protection, born in 1884 and employed in 1923. This man gave a history of an episode of heart pain associated with dyspnea in 1935. In December, 1939, he showed the E.K.G. changes demonstrated in Fig. 8. The x-rays over the years showed no change. In 1941 his E.K.G. had returned to normal after his cardiac accident but because of a lowering of his B.P. and the occurrence of ventricular extrasystoles it was felt that his prognosis must be guarded. At that time he requested to remain at work, signing a release relieving the Medical Department of responsibility in case of any sudden cardiac difficulty. He is still working today at a moderately sedentary job; to all outward appearances he is perfectly well. This case demonstrates only too clearly to us the unpredictability of coronary artery disease.

FROM the group of representative cases presented it can be seen that there are many unknown factors in heart disease and employment. From our other cases observed over a period of 10 years there are certain other impressions which we have obtained. The age of the employee is of great importance. A young rheumatic heart with a high grade lesion and evidence of progressive enlargement appears to do badly in most work. The degree of enlargement plus evidence of change from year to year appears of utmost importance in prognosis. In the hypertensive group past 50 years of age we have been surprised at the ability to carry on past expectancy. Many of these employees live out a normal span of life and work right up to the time of a sudden accident, often a cerebral one.

In the group with hypertension over a period of years the ages at death ranged from 52 to 75 years, with the younger ones dying of renal complications in one case, other factors being present in one other case. From our observations it appears that the hypertensives had as short a period of disability before death as did the average worker, and their degree of usefulness as employees continued good up until their severance from work.

From the rheumatic group we believe there is need for close cooperation between the family physician and the industrial physician and the consideration of each on its individual merits. We have found x-rays of heart size to be of greatest value in follow-up and electrocardiograms of perhaps the least value.

Perhaps the most difficult cases are those with acute coronary thrombosis. Unfortunately, our 10-year study shows that we make errors in more than a few in being too conservative as to prognosis and employability. On the other hand many of the coronary cases have met with sudden death. The incidence of atherosclerosis being present elsewhere in the body is high in coronary cases, and this leads to a doubtful prognosis in many of these cases. We feel that when all studies are taken into consideration the electrocardiogram can be misleading at times and is of no value in predicting sudden death due to coronary thrombosis. The interpretation of serious cardiac impairment on the E.K.G. alone is to be deplored and it is our impression that this one test should not be used to exclude re-employment in some cases.

CONCLUSION: (1) Eight cases of heart disease are presented as seen from a 10-year retrospective view.

2. The use of serial yearly x-rays is of greatest value in follow-up.

3. Each cardiac has to be considered as an individual problem.

4. The E.K.G. is often misleading as to prognosis.

5. Close cooperation between the family physician and the industrial surgeon is needed in cases of cardiac disease.

Addenda

I. CLASSIFICATION OF CASES STUDIED: In the foregoing paper we did not report a statistical study of the cases of heart disease studied by us over the 10-year period; this omission is supplied in Table 1.

TABLE 1.

	Exam. 1939	Dead 1949	Not Working 1949	Still Working 1949
Hypertension	14	7	4	3
Rheumatism	8	5	2	1
Syphilis	2	1	0	1
Coronary Insufficiency	2	0	0	2
D. A. H.	2	0	1	1
TOTAL	28	13	7	8

Approximately half of the cases originally studied died during this period, and an additional 25% are no longer working here.

II. CAUSES OF DEATH COMPARED FOR TWO PERIODS: To emphasize the increasing importance of cardiac deaths in industry, Table 2 is furnished. This shows a comparison of the causes of death occurring at this plant in two periods, the early period from 1927 through 1939 and the late period from 1940 through 1948. The causes of deaths are expressed in percentages of total deaths and show an increase in cardiovascular deaths from 19% in the early period to 37.3% in the later period.

TABLE 2.

Causes of Death	1927-39	1940-48
Number of Deaths	200	153
A. External Causes	16.5%	25.6%
B. Infectious Disease	33.0%	7.2%
C. Malignant Disease	33.0%	15.0%
D. Cardiovascular Disease	19.0%	37.3%
E. Surgical Conditions	14.5%	5.2%
F. All Others	8.0%	9.7%
	100.0%	100.0%

III. CLASSIFICATION OF CARDIAC DEATHS: In Table 3 the cardiovascular deaths of the period 1940-1948 are classified as follows:

TABLE 3.
CARDIOVASCULAR DEATHS 1940-1948

	Actual Number	Average Age
Coronary Insufficiency	25	55 years
Cerebral Hemorrhage	10	55 years
Ruptured Aneurysm	2	69 years
Hypertensive	8	53 years
Rheumatic	8	46.5 years
Unclassified	4	
Total	57	

During the past nine years our plant has had 57 cardiovascular deaths inclusive of the 13 in our study. Of this number 25 were described in the death certificate as having died from coronary occlusion. Ten died from cerebral hemorrhage, two from ruptured aneurysms, eight from hypertensive heart disease, and eight from rheumatic heart disease. Four were unclassified.

IV. DIFFICULTY OF CLASSIFICATION: It is difficult to be exact in the grouping of cardiovascular disease from the death cretificate alone. In cases of sudden non-traumatic death, and without autopsy, the coroner signs the certificate of death "due to coronary embolism." Many times there is no antecedent history of ill health, and the only physical examination of record is such as the industrial physician has made. Twelve of the 25 deaths from coronary occlusion were entirely unexpected, six had had previous attacks and had returned to work. Some of these cases we had listed prior to death as hypertensive heart disease. Almost all of the deaths from cerebral hemorrhage had been listed before the final disaster as hypertensives. So with this classification of causes of death the number listed as dying from hypertensive heart disease was reduced. But definitely all of these cases—the coronary deaths, cerebral hemorrhage deaths, aneurysmal deaths and many of the hypertensive deaths—were primarily deaths from arterial disease.

After all, we make a mistake in being too nice about our classification. We definitely have a rheumatic heart group and for the rest the coronary and cerebral accidents are based on the same pathology of intimal arterial disease while in the hypertensives the heart finally succumbs but only after a valiant effort to atone for the sins of the arteries. Some of the x-ray films we have shown bear out this statement.

V. RECENT STUDIES: There seems to be a difference of opinion as to whether arteriosclerosis may be divided into two groups, one in which the intima is chiefly affected (atheroma) and the other in which the media is the diseased portion of the artery; or whether the two conditions exist together with the intimal lesions predominating in some cases, the medial lesions in others.[1] While researchers are making up their minds about this we have seen enough autopsies to fix in our minds that atheroma is the great killer.

In times past we have considered atheroma an irreversible condition, but hope has been given us by recent research. This opinion has been made by animal experimentation. It is not our purpose to review this work except to state that the highlights show a high cholesterol diet with depression of the thyroid by thiouracil produces atherosclerosis, which a high cholesterol diet of itself will not do.[2] It would seem that in atheroma we are dealing with a disease of metabolism. As industrial physicians our efforts then should include the B.M.R. as well as the E.K.G. in further study of these conditions.

VI. PROPOSED STUDY FOR INDUSTRIAL DOCTORS: We would suggest a study in selected men over 50: observation of their eating habits, basal metabolic rates, blood cholesterol, as well as their occupation, their habits of exercise, smoking, drinking, etc. If such a study could be maintained in a constant group over a period of a few years we might be able to come up with some deductions. Certain it is we start from scratch, for we know little of the etiology of atheroma in the human body at the present time. Our experience in a few cases would indicate that the menace of atheroma can at least be checked if not reversed by a proper regimen of living.

Our thought is that in our factories we have an immense amount of material for study; and that if we could get together with research workers in the universities and hospitals of the country, we could develop a line of cooperative study which would further the work that needs so badly to be done in increasing our knowledge of the causes and means of retardation if not actual prevention of vascular disease.

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Summary of Physical Findings of Employees Over Sixty Years of Age

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BETTER to understand the physical condition of the aging employee, a summary of the physical findings and laboratory data of 108 employees, 60 years of age and over, was prepared and studied. These were classified in three groups according to age. There were 72 in the age group of 60 through 64 years, 25 in the 65 through 69 group, and 11 who were 70 or more years of age. In addition to a complete physical examination, a chest x-ray, urinalysis, and electrocardiograph were done.

Table 1 shows the dental findings.

TABLE 1.
DENTAL FINDINGS

Age Group	Edentulous	Double Plates	Plates Plus Natural Teeth	Good	Fair	Poor
60-64	0	22	11	6	15	18
64-69	3	8	2	3	0	9
70+	3	3	2	0	0	3

It is observed that three out of 11 in the group of 70 and over are both edentulous and with no dentures, as are three out of 25 in the 64 to 69 group. None of the 72 in the 60 to 64 year group is both edentulous and without dentures. Double plates are the most common finding in the entire group. In mouths equipped with partial plates plus some natural teeth the dentures are often found to be in poor condition or incomplete because of failure to have additional work done as more teeth are lost or become decayed. In general, complete double plates are the most satisfactory form of replacement. Only nine of the entire group have good natural teeth. In 15 more there is no obvious infection but the number of teeth is insufficient to function properly in chewing. Thirty have teeth that are considered to be in poor condition. These give evidence of advanced decay or gingivitis that make them undesirable from a medical as well as mechanical point of view.

Physical Examination of the Lungs

IN TABLE 2 the decline in negative findings on physical examination of the lungs is observed to be from 93% in the 60 to 64 group to 63.6% in the group of those over 70 years of age. The incidence of emphysema as it is revealed on physical examination increases from 4.2% to 36.4%.

TABLE 2.
PHYSICAL EXAMINATION OF LUNGS

		Negative		Emphysema		Bronchitis		Tuberculosis	
Age Group	Number in Each Age Group	No. Cases	% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group
60-64	72	67	93	3	4.2	2	2.8	0	0
65-69	25	18	72	5	20	1	4	1	4
70+	11	7	63.6	4	36.4	0	0	0	0

Physical Examination of the Heart

THE percentage decline of negative findings in the physical examination of the heart is from 82 to 54.5. This is shown in Table 3.

TABLE 3.
PHYSICAL EXAMINATION OF THE HEART

		Murmurs		Fair or Poor Heart Sounds		Changes in Rhythm or Rate		Negative	
Age Group	Number in Each Age Group	No. Cases	*% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group
60-64	72	8	11.1	2	2.9	5	6.9	59	82
65-69	25	3	12	5	20	4	16	16	64
70+	11	3	27.2	2	18.2			6	54.5

*In this table a few individuals are included in more than one column, therefore the sum of the percentages will be greater than 100.

There is an increase in significant murmurs from 11% to 27%. Of the 60 to 64 group, 2.9% are found to have heart sounds of either poor or fair quality. This figure compares with 18.2% in the oldest group. Irregularities such as extrasystoles and rate changes such as tachycardia are indicated in the third column. The number of individuals in this column is too small to show any trend but they are included so that all the material is presented. This also applies to the last two columns in Table 2. It should be noted that in Table 3 the percentages of positive findings added to the percentage of negative findings come to more than 100 as some of the individuals when they have more than one physical finding are included in more than one column.

Chest X-Ray

THE number of abnormal findings is much higher when the lungs are studied by x-ray than when they are studied by physical examination. Emphysema is much more commonly indicated by uneven densities of the lung fields on the film than by changes in respiratory sounds on auscultation. In Table 4 we see that this condition occurs in 12.5% of the youngest group, 20% in the middle group, and 36.4% in the oldest group. A certain degree of emphysema should be considered within normal limits in the aged.

In the cardiovascular system the x-ray is able to pick out dilatation of the aorta in many who have no physical signs of disease. The percentage is about the same in the three groups of our series. Here again a moderate widening should

TABLE 4.
CHEST X-RAY FINDINGS

Age Group	No. in Each Age Group	Negative		Emphysema		Pneumoconiosis		Bronchitis Increased Hilar Shadows and Linear Markings or Scattered Calcification		Arrested Tuberculosis		Wide Aorta		Heart Widened	
		No. Cases	% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group	No. Cases	% in Each Group
60-64	72	36	50	9	12.5	1	1.4	9	12.5	0	0	16	22.2	1	1.4
65-69	25	9	36	5	20	1	4	2	8	1	4	5	20	2	8
70+	11	3	27.2	4	36.4	0		0		1	9.1	2	18.2	1	9.1

not be considered too unusual. Indeed, we have followed several cases of rather marked dilatation of the aorta over a period of several years with no apparent change in status or with but a slow deterioration of vascular efficiency.

The Electro-Cardiographic Findings

FOR purposes of classifying our electrocardiographs DR. FRANCIS WEBER, Cardiologist, of Newark, New Jersey, and the writer modified the schedule of DR. HOWARD SPRAGUE, of Boston, that appeared in his article on the Employment of Cardiacs in INDUSTRIAL MEDICINE in 1948.[1] This modified classification is shown in Table 5.

TABLE 5.
ELECTROCARDIOGRAPHIC CLASSIFICATION

Class 1:
Auricular fibrillation and flutter.
A-V block.
Inverted T one, or T one and T two without left axis deviation.
Inverted T two and T three.
Chest lead—inverted T wave and absent R wave.
Bundle branch block.
Class 2:
Auricular fibrillation and flutter.
Chest lead—inverted T wave and absent R wave.
Lesser degrees of intraventricular block.
Flat T one.
Left axis deviation with abnormal T one.
Delayed P-R conduction.
Class 3:
Premature beats.
Left axis deviation with normal T one.
Right axis deviation.
Low T all leads.
Slight QRS notching.
Class 4:
Normal:

Class 1 contains the most serious electrocardiographic abnormalities and Class 2 those that are important but are not so serious as those in Class 1. Class 3 is composed of those with slight deviations from the normal, and Class 4 of the normal ones. Some findings as, for instance, auricular fibrillation, are listed in more than one class. Attendant electrocardiographic findings are used as criteria in placing them in one group or the other.

Electrocardiographs were taken on all persons in our study except one who was not available as he was on a long leave of absence because of ill health. Our results in classifying our employees according to the schedule are shown in Table 6. It is interesting to note that the percentages of normal and almost normal are constant in all three age groups. However, the proportion of electrocardiographs with severe abnormalities increases from 5.5% to 20% with increasing age.

TABLE 6.
ELECTROCARDIOGRAPHIC CLASSIFICATION

Age Group	Number in Each Age Group	Class 1		Class 2		Class 3		Class 4	
		No.	%	No.	%	No.	%	No.	%
60-64	72	4	5.5	11	15.3	28	38.9	29	40.3
65-69	25	5	20	1	4	10	40	9	36
70+	10	2	20	0	0	4	40	4	40

Blood Pressure

FOR the purpose of classifying blood pressure readings in this group the definitions given by Russek and Zohman in their study of normal blood pressure in senescence were used.[2] Normal blood pressure is defined by them as blood pressure in which the systolic reading is 149 mm. Hg. or less and the diastolic is 95 mm. or less. Systolic hypertension has a systolic reading of 150 mm. or more with a diastolic of 95 mm. or less. In diastolic hypertension the diastolic pressure is 96 mm. or more. Table 7 shows our population classified according to these definitions.

The average blood pressure of the entire group is 153.3 mm. Hg. systolic and 85.0 mm. Hg. diastolic. Table 8 shows the averages of the blood pressure of the various classes.

TABLE 7.
BLOOD PRESSURE READINGS

Age Group	Number of Individuals In Group	Normal		Systolic Hypertension		Diastolic Hypertension	
		No. Cases	%	No. Cases	%	No. Cases	%
60-64	72	29	40.3	27	37.5	16	22.2
65-69	25	11	44.0	10	40.0	4	16.0
70+	11	3	27.3	5	45.4	3	27.3

TABLE 8.
AVERAGES OF BLOOD PRESSURE (IN MM. HG.)

Age Group	Number in Each Age Group	Systolic	Diastolic	Pulse Pressure
60-64	72	152.0	85.1	66.9
65-69	25	154.3	85.4	68.9
70+	11	159.8	83.8	76.0

Incidence of Hernia

TABLE 9 shows the incidence of inguinal hernia. One of the cases listed as an unrepaired

TABLE 9.
INCIDENCE OF HERNIA

Age Group	Number In Group	Unrepaired				Repaired			
		Right	Left	Bilateral	Total	Right	Left	Bilateral	Total
60-64	72	6	2	12	20 (27%)	1	1	2	4 (5.5%)
65-69	25	2	1	7	10 (40%)	0	1	1	2 (8%)
70 +	11	0	0	2	2 (18.2%)	0	1	0	1 (9.1%)

right inguinal hernia in the 60 to 64 year group is a recurrent hernia. The others listed as unrepaired are hernias that have never been operated upon. Because of the limited material presented here, no trend in the incidence of hernia with increasing years is shown. The table is of interest however in showing the percentage of hernia in older men. In the entire group of 108 people there are four women. In the group of 104 males there are 32 individuals, or 30.8%, with unrepaired hernia either single or double, and seven individuals, or 6.7%, with repaired hernia. There are 39 of 104 men, or 37.5%, who now have a hernia or who once had one that was surgically repaired. These results are similar to those I obtained in a previous study.[3] There are also two cases of umbilical hernia, one in the 65 to 69 year group and one in a man older than 70. There is one incisional hernia in the 60 to 64 year group.

Miscellaneous Findings

TABLE 10 shows some miscellaneous findings. The saphenous varicosities have caused trouble in only a few cases, but of course they constitute a potentially serious factor in causing disability. The frequency of glycosuria in this series shows the importance of doing routine urine examinations in elderly employees.

TABLE 10.
MISCELLANEOUS FINDINGS

Age Group	Number In Group	Saphenous Varicosities		Urine			
				Albumen		Sugar	
		No.	%	No.	%	No.	%
60-64	72	14	19.4	2	2.8	1	1.4
65-69	25	7	28.0	1	4	4	16
70	11	3	27.0	0	0	0	0

Discussion and Conclusion

ALL STUDIES of American Vital Statistics tell us that our population is becoming an older one. This is reflected in the experience at the Hyatt Bearings Division where the average age of the male employee was 35.6 years in 1938 and 43.5 years in December, 1948. Factors other than the increasing national age, such as the hiring of older people during the war years and the reluctance of employees to give up their jobs in a plant where working conditions are good, have contributed to this marked increase in the average age of the population at Hyatt. But besides these factors the age trend is upward and the trend at Hyatt parallels the general trend in industry.

We, as industrial physicians, know the problems that arise in the employment of people who have the physical defects that are present in Hyatt's 108 elderly workers. We also know some of the problems that face the factory supervisors in the placement of these people. Many of them obviously are eliminated by their physical condition from consideration for employment in many unskilled fields where strength and health are essential. Those whose jobs depend largely on skill and experience are more easily kept at productive employment as they become older.

In the near future much thought must be given by both industrial managers and physicians to the problems suggested by the material in this paper. The industrial physician must add the fields of industrial gerontology and industrial geriatrics to his already formidable list.

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Supplemental Comparative Study of the Incidence of Physical Defects in Three Age Groups

THE purpose of this study is to compare the incidence of physical defects in two other age groups with that of employees over 60. The material used is a group of 50 relatively young employees (30 to 35 years of age) and a group of 50 middle-aged employees (45 to 49 years of age) both selected at random. These two are compared with the group discussed in the "Summary of Physical Findings of the Aging Employee" (60 years of age or older).

Explanation of Tables

EXCEPT in a few tables in which the number of individuals is given in the column headed by "Number in Group," the percentages given are of 50 individuals in each of the younger groups. Consequently, the number of individuals in any classification may be found by dividing the percentage by two. In the older group, the percentages given are of 108 individuals except where it is otherwise noted in the tables. In Table 15 the material consists of 107 individuals in the older group, 28 in the middle group, and none in the younger group. The classes referred to in this table are explained in Table 5 of the "Summary of Physical Findings in the Aging Em-

TABLE 11.
DENTAL FINDINGS (EXPRESSED IN PER CENT)

Age Group	Edentulous	Double Plates	Plates Plus Natural Teeth	Good	Fair	Poor
60+	5.6	30.6	13.9	8.3	13.9	27.8
45-49	0	16.0	10.0	34.0	10.0	30.0
30-34	0	2.0	10.0	78.0	0	10.0

TABLE 12.
PHYSICAL EXAMINATION OF THE LUNGS (FINDINGS EXPRESSED IN PER CENT)

Age Group	Negative	Emphysema	Bronchitis	Tuberculosis
60+	85.1	11.1	2.8	1.0
45-49	96.0	0	4.0	0
30-34	98.0	0	2.0	0

TABLE 13.
PHYSICAL EXAMINATION OF THE HEART (FINDINGS EXPRESSED IN PER CENT)

Age Group	Negative	Murmurs	Fair to Poor Heart Sounds	Changes in Rhythm or Rate
60+	75	10.8	7.1	7.1
45-49	86	6.0	4.0	4.0
30-34	96	2.0	0	2.0

TABLE 14.
CHEST X-RAY FINDINGS (EXPRESSED IN PER CENT)

Group	Neg.	Emphysema	Pneumoconiosis	Bronchitis, Increased Hilar Shadows and Linear Markings, Scattered Calcificat.	Arrest. Tuber.	Wide. Aorta	Enlarged Heart
60+	44.5	16.7	1.8	10.2	1.8	21.2	3.7
45-49	66	4.0	2.0	14.0	4.0	6.0	4.0
30-34	88	0	0	10.0	0	2.0	0

TABLE 15.
ELECTROCARDIOGRAPHIC FINDINGS (EXPRESSED IN PER CENT)

Age Group	No. in Group	Class 1	Class 2	Class 3	Class 4
45-49	28	3.6	0	28.6	67.8
60+	107	10.3	11.2	39.2	39.3
30-34	None				

TABLE 16.
BLOOD PRESSURE CLASSIFICATION (EXPRESSED IN PER CENT)

Age Group	Normal	Systolic Hypertension	Diastolic Hypertension
60+	39.8	38.8	21.3
45-49	82.0	8.0	10.0
30-34	94.0	0	6.0

TABLE 17.
BLOOD PRESSURE AVERAGES (IN MM. HG.)

Age Group	Systolic	Diastolic	Pulse-Pressure
60+	153.3	85.0	68.3
45.49	135.7	83.6	52.1
30-34	124.4	78.4	46.0

TABLE 18.
INCIDENCE OF HERNIA IN MALES (EXPRESSED IN PER CENT)

Age Group	No. In Group	% With Unrepaired Inguinal Hernia Single or Double	% With Repaired Inguinal Hernia Single or Double	TOTAL
60+	104	30.8	6.7	37.5
45-49	44	22.7	4.5	27.2
30-34	43	4.6	7.0	11.6

TABLE 19.
INCIDENCE OF MISCELLANEOUS FINDINGS (EXPRESSED IN PER CENT)

Age Group	Saphenous Varicosities	Urine	
		Albumen	Sugar
60+	22.2	2.8	4.6
45-49	10.0	0	2.0
30.34	4.0	0	0

TABLE 20.
WORK CLASSIFICATION OF EMPLOYEES (EXPRESSED IN PER CENT)

Penultimate Examination	Last Examination	Age Group		
		60+	45-49	30-34
Any Work	Any Work	8	42	64
Average	Average	4	32	22
Moderate	Moderate	14	10	4
Light	Light	36	6	4
Work Classifications Changed				
Any Work	Average	10	2	6
Any Work	Moderate	2		
Any Work	Light		2	
Average	Moderate	6	6	
Average	Light	4		
Moderate	Light	16		

ployee." In compiling Table 18, dealing with inguinal hernia, only male employees were used. Consequently, the percentages are of 104, 44 and 43 male individuals respectively.

Table 20 gives the employment classification of these three groups of employees. They are divided for practical purposes into four categories, fit for any work, fit for average work, fit for moderate work and fit for light work. The first four horizontal lines in the body of the table list those in which there was no change of classification between the last examination and the one immediately preceding. The last six lines list those in which there was a change in classification. It will be seen that the older group not only has a larger proportion of people in the lower classifications but also has a larger proportion in which the classification has been changed. We believe that the tables will otherwise be self-explanatory.

Discussion

THE figures given in the tables, although based on a small number of individuals, are in line with other studies and indicate in a general way the correlation of increasing numbers of physical defects with increasing age. It is reasonable to conclude that examinations of older employees should be more frequent and more complete than those of younger ones. Not only have they more physical defects, but the appearance of new defects occurs at a faster rate. This is made clear by Table 20. It shows that only 6% of the younger group and 10% of the middle group received a change of classification in their last examination. Most of these did not indicate a deterioration of physical condition but were temporary, as for example after surgical operation or acute illness.

In the older group 38% were reclassified, all of them permanently because of deterioration due to aging.

A corollary of the propostion that more frequent and more complete examinations are desirable in older workers is that to keep up a given standard of medical supervision the older the industrial population becomes the more medical facilities must be available. To serve its purpose as a health guide to the employee as well as an aid in his proper placement in the factory, the physical examination should be reasonably complete and sufficient laboratory diagnostic procedures should be used. A chest x-ray is indispensable. Examination of the urine should be done. Electrocardiography, although time-consuming, is desirable.

In most industrial hospitals time is the limiting factor that keeps us from doing periodic physical examinations. I believe that one complete examination at longer intervals is better than two superficial examinations at shorter intervals. In apportioning available time to the physical examination of workers it is desirable that preference be given to the older ones, even though this means that many of the healthier younger ones may not be examined for a few years.

AT THE 1946 General Motors Medical Conference in Rochester, MR. C. F. KETTERING suggested a diagnostic scale in which you drop a penny and out comes a complete diagnosis. We have worked hard on the development of such a scale but so far each time we improved our examination or enlarged its scope, we also increased the time required to do it.

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Experiment in Education of the Older Workers

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PROFESSOR RONALD E. LANE, F.R.C.P., Chair of Occupational Health, University of Manchester, states: "The doctor and nurse in industry have numerous duties which may, roughly, be divided into three groups:

1. To see that the worker is fit for the job.
2. To see that the job is fit for the worker.
3. Education."

He further explains education: "Contact with large numbers of people gives great opportunity for health education. It must be remembered that management may be in as much need of this education as work people and that, because of the influence those in authority exert, it may be especially productive."

AGE OF MALE POPULATION OF UNITED STATES

In 1900	14.1%	45-64	4.0%	65 and over	= 18.1%	over	45
In 1940	20.2%	"	6.7%	"	= 26.9%	"	
In 1960	21.9%	"	8.4%	"	= 30.3%	"	
In 1980	23.6%	"	9.9%	"	= 33.5%	"	

Industry which has been in operation for 30 years or more, has witnessed a gradual, increasing average age of its employees, and a noticeable increase of employees, faithful, loyal, valuable men who are 65 years of age and over.

Education

DEAN CYRIL HOULE, of the University of Chicago, criticized the assumptions of the past, that schools, from elementary through college, had to give their students enough education to last a lifetime. Colleges and universities must reconstruct the curriculum, according to the principle of a life-long education, he said, providing "for young people, those basic and structural elements which are best learned at that time of life, and must also plan a program of continued study to extend, broaden, and modernize the education of its alumni throughout life."

"Continued learning is a necessity to living at every phase of life." (Tibbitts.)

"Educators have given only passing recognition to middle age and on."

"As an individual grows up, society (the local group, the community, the state) changes the demands it makes upon him."

"Our educational system is geared to a life expectancy 15 years less than today."

The Industrial Physician

IS THIS problem then, of education of the worker, the middle-aged and up worker who is forming the greater part of the roll of employees, not the duty of the doctor in industry? If the doctor would understand that the job does not supply the sense of satisfaction or belonging, and that the workman must obtain these satisfactions in his home and his community, then it is necessary to learn the technique of social and mental rehabilitation.

THE doctor in industry must take the lead, for:

1. He is in a preferred position between the employee and management—and learns through his intimate contact with the man all his physical, social, and mental problems much better than management, the personnel department or even the man's own private physician.

2. His contact with the man spreads through to the man's family.

3. He can interest management in the necessity of this side of health—for, until management is convinced that the technical and social sciences must advance together, no appreciable change can take place.

You have seen the strides made in accident prevention and elimination through the personal interest of top management. So too, the "top" must lend every encouragement and enthusiasm to the social and mental hygiene of his employees.

General Motors of Canada, Walkerville, with 551 salaried and hourly workers has an average age of employees of 44 years: of ages 21-44, 271 employees; of ages 45-64, 260 employees; and of ages 65 and over, 20 employees. Thus, 50.9% of our employees are 45 years of age and over.

Experiment in Education or Group Psycotherapy

A LITTLE over two years ago, a complete physical examination was made of all employees 55 years of age and over. At that time, an interview was conducted and a rather complete life history of the man's activities recorded. In addition, his then family position, his avocations, and his attitudes toward the time when he could not work but must live another type of life, and also his work record, were obtained. In order that conclusions of fairness could be made, these histories were reviewed by management, and, in the main, the opinions agreed.

From this study, it was concluded that some instructions in the art of growing older might be helpful. The fact of leaving active work, through the company retirement policy, through physical inability to produce as a result of aging or intercurrent illness or accident, was becoming more persistent each day.

A review of recent literature, books, and magazine articles, while emphasizing the need of some type of preparation for the problems of later life found no proposed method of presenting this to a group. Individual thinking and digestion of the problem might be possible by a few, but, the Army procedure, during the last war, in its

classes of group or mass psychotherapy, seemed a better way to go about it.

During February, 1948, a series of discussions on the problems of later maturity and old age, was offered by the Extension Department of the University of Michigan, arranged by the staff of the Institute for Human Adjustment, under the direction of Professor Clark Tibbitts. Here then, was to be found a method of presentation of this subject, which, if the technique were learned, could be used in giving a series of talks and discussions to workmen of the older age group.

Accordingly, through the cooperation of the manager, these lectures were attended, a series of 15, accompanied each evening by one of the older foremen from the plant. The thrill created in these foremen, in going to a university, sitting in a class-room, and taking instruction from a professor, was heartening.

At the conclusion of this series of lectures, a further three-day seminar was held, at which more precise information on the subject matter was given by many famous geriatric and economic leaders of the United States.

In the autumn of 1948, these foremen became a nucleus committee, to consider (1) the advisability of holding a similar class for workmen and their wives, (2) setting the age limit at 55 and over, and (3) the selection of an outside-the-plant meeting place, time of meeting, subjects to be covered, etc. The decision was to hold a series of classes for working men aged 55 years and over, with their wives, in the Vocational School each Monday evening for 10 consecutive weeks. Fifty-two enrolled in the class, with an average attendance of 40.

THE following was an outline for a discussion course on "The Problems of Older Age" at the Vocational School in Windsor:

Jan. 10. *Introductory statement*—with discussion of the significance of the problem, reason for offering the course, and topics to be considered. DR. R. B. ROBSON, Medical Director.

Jan. 17. *Physical Health*—general discussion of the aging process, physiological changes, general physical conditions, suggestions of what to do and what to avoid. DR. J. W. BRIEN, F.R.C.S., Senior Physician and Surgeon of Windsor.

Jan. 24. *Psychological Factors*—personality, why we behave as we do, disappointments, attitude toward work, frustration, typical natural mental changes with age. DR. WILMA DONAHUE, Psychologist, University of Michigan, Ann Arbor.

Jan. 31. *Mental Health*—the good and bad in older persons; annoyances. Effects of retirement from work, marriage of children, death of spouse or close friends. How we can keep from becoming queer. DR. E. A. METCALFE, Psychiatrist, Westminster Hospital, University of Western Ontario, London.

Feb. 7. *Living Arrangements and Housing*—social and psychological problems of living with relatives, alone, in homes. Living and housing problems in relation to health, interests, and activities. Ideal housing for older people. MRS. PATRICIA W. RABINOWITZ, Division Head, Wayne County Bureau of Social Aid, Detroit.

Feb. 14. *Recreation*—a leisure time activity a necessary element in life; a creative activity with a demonstration of leisure time activity. WILLIAM G. ROBINSON, Assistant in Community Organization, University of Michigan, Ann Arbor.

Feb. 21. *Gardening as a Leisure Time Activity*—gardening an activity which can be developed and carried on before older age and through old age; provides good health and happiness through keeping busy. MR. HAROLD S. OSLER, County Agricultural Agent, Ann Arbor, Michigan.

Feb. 28. *Community Interests*—citizenship and participation in community activities, church work, lodge work, adult education, library-books, art gallery. SPENCER F. HARRIS, Safety Director, General Motors, Walkerville.

Mar. 7. *Economics*—the problem of maintaining an acceptable level of living for the aged. PROFESSOR REILLY, Economics Department, University of Western Ontario, London.

Mar. 14. *Legal Problems*—how to make a will, estates, trusts, legal services. Speakers to be announced.

Mar. 21. Review of all the problems. DR. R. B. ROBSON, Medical Director.

Course Content

THREE broad fields were to be discussed: (a) Financial, (b) Health, (c) Social.

FINANCIAL SECURITY: As the subject of pensions, either from company policy or governmental plan, was a matter of economics beyond the control of the medical or personnel department, this subject was omitted from the lecture course, except to emphasize the need for curtailing expenses, keeping the house in order, developing an avocation which might, in the later years, become a profitable vocation to aid a pension not great enough to support the workman and his dependents, should the occasion arise. It was continually stressed, "No pension plan can ever fill all the needs of usefulness," and to practice a possible avocation while still earning and not wait until retirement came and capital dissipated on a venture which was not as attractive or profitable as first conceived. *Retirement* was avoided in discussion, for we concluded that change of occupation was, perhaps, necessary while retirement spelled inactivity, vegetation, and usually early death.

PHYSICAL AND MENTAL HEALTH: Professor Tibbitts outlined these two important subjects as: (1) health problems of senescence, with suggestions for comfortable living; and (2) an identification of the personality changes that might be expected to come about, together with suggestions for avoiding the undesirable ones.

In the presentation of natural biologic aging with its involutionary processes, the differing times of these changes in different individuals were combined with the diseases of older life—how they could be overcome or, at least, lived with. Mental health involved the definition of adjustment; how an understanding of future possibilities made the period of unadjustment of short duration; the need for early readjustment, and the dangers of maladjustment.

PSYCHOLOGICAL CHANGES: A review of the simple facts of psychology to bring out the cause of frustration, and the slow deterioration of the mental and spiritual faculties was presented. The continued exercise of the psychological processes, and the maintenance of human relationships could well be the best guarantee of satisfaction in old age.

LIVING ARRANGEMENTS: The question of where, with whom, and how, to live concerns not only the older worker and his wife, but also their children. Rural living, where the aged could find activities and happiness in the homes of their children, was contrasted with the present urban dwelling or apartment with its limited accommodation and lack of facilities for taking in the old folks. The crowded condition of present "Homes for the Aged," with the long waiting lists, and the urgency for the community to recognize the increase in numbers of oldsters and the early building and maintaining of suitable quarters were emphasized. By illustrating the irritations presented by several generations living together, it was hoped to prevent future errors.

LEISURE TIME ACTIVITIES: The word "hobby" was avoided. The need is to have or to learn an avocation which is not a "pastime" but rather is creative in nature. Older people receive satisfaction doing things which are useful, contributing to the welfare of the community, and realizing the pride of achievement. The need of recreation was not omitted but emphasized. Physical participation in sports was presented. This entire subject was, perhaps, the most interesting, for it included gardening and the various cultural interests of the local community. Several of the workers gave their own experiences, with practical demonstrations of their activities.

WILLS AND ESTATES: The value of a will, what comprises an estate, and the distress and confusion attendant upon a disregard of these matters, were given. Many examples, applicable to the average working man, were cited. The discussion and questions asked revealed the desire for more sound explanation of this subject.

METHOD OF PRESENTATION: The meetings were held in the Library of the Vocational School. This location was outside factory atmosphere, and in a building which is the center of various other evening classes for adults. The lectures began at 7:30 P.M., continuing usually for one hour, with a discussion period following. The evening ended with a showing of a motion picture travelogue. The lecturers were experts in their subject, mainly from the staff of the University of Michigan, or the University of Western Ontario. Three local speakers were used, men of prominence in the community. One of these, the Safety Director of the plant, was well received, being given the subject, "Community Interests." The attendance of employees and their wives was considered satisfactory. Professors commented that the attention given was better than received in their formal classes at the university.

Results of the Experiment

EVERY working man who attended these classes has been interviewed and the following reactions resulted:

1. The series of discussions was well received by all.
2. Each man expressed the hope that similar lectures would be carried on next winter.
3. The men talked over with their wives subjects that had previously not been discussed.
4. Many men brought in clippings from papers and magazines, dealing with later maturity.
5. Opinion was given that the age limit of classes should be lowered to age 45 and even made shop-wide.
6. A preliminary talk to a foremen's meeting, explaining the aims and objects of the course would have given better publicity.
7. The sympathetic leadership of management and the enthusiastic support of the chief steward of the union were prime factors in the success of the experiment.

The Significance of Lead in Biological Fluids (Abstract)

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A PROGRESS report was made on the results of lead analyses of 751 urine and 1,735 blood specimens collected from a group of about 1500 men during 1948.

In order to establish the relation or ratio that existed in the lead content of blood and urine, specimens of each were obtained at essentially the same time from a group of 100 men. In about half the men the ratio (of milligrams lead per liter of urine/milligrams lead per 100 grams blood) fell between 1 and 2 and the mean ratio for the group was 2.14. The ratios ranged, however, from 0.4 to 8.5 and the deviation from the mean was so great that, for a single sample or even a small group of samples, it was concluded that no prediction regarding the ratio can be assumed. The large variation in this ratio was found to be due to variations in urinary leads while blood lead levels were more constant.

Results of blood and urinary lead analyses were presented graphically according to plants as well as occupations. Solder removal with power grinders gave rise to the highest results, while tinning and torch soldering were at the low end of the scale.

IT WAS concluded that where men are exposed to lead dust or fume, blood leads are a helpful index of recent lead exposure and absorption; and that when such blood samples are collected according to plan (in evacuated tubes properly cleaned and processed) they are more reliable than spot urine specimens.

The lead results from biological fluid analyses are a diagnostic aid in that they serve to focus medical attention upon individuals and to provide a cause and effect relationship between lead absorption and non-specific symptomatology. A tentative interpretation of blood lead values is:

Mg. per 100 gm blood	
0.01 — 0.06	Within the normal range for persons with no industrial exposure to lead.
0.07 — 0.08	Not unusual for men with an industrial exposure to lead.
0.09 — 0.10	Excessive exposure and absorption at the lower level of the unsafe range in which symptoms have occurred in some persons. The physician should be alert and as soon as convenient he should submit additional blood or urine specimens for analysis. Repeated such results on one individual or several such results in a group indicate that the exposure should be investigated and the cause corrected.
Above 0.10	Results in this range indicate greater exposure and more necessity for correction.

No single result carries a large amount of significance until it has been confirmed by an additional test. Lead in blood or urine even in the higher ranges is not necessarily an indication of illness or of impending illness, but it does indicate lead absorption and the need for observation and investigation.

Practical Methods for Handling Psychosomatic Problems in Industry

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IT IS a privilege and a pleasure to talk to you today. I want to share with you some of our experiences of the past five years in industry.

Not long ago, I dropped into the office of a less fortunate colleague in psychiatry, one who didn't have the good fortune of working in industry. He was sitting in his office alone with his head in his hands, looking very dejected. I asked him what the trouble was. He remarked, "Well, I guess I need a psychiatrist." I asked him why he didn't consult himself. He said, "I can't, darn it, I am too expensive."

Now in our field today, we are not going to limit ourselves to so-called straight psychiatric patients. The interest in this topic which you have all expressed, applies much more to the run-of-the-mine type of problems that you pick up in your daily work. It is hardly necessary to emphasize the importance of adequate handling of these people with various types of personality problems, as they show up so frequently in such difficulties as labor turnover, accident frequency, grievances, sick absences and so on.

Most of you no doubt are familiar with the excellent statistical work that DR. WILLIAM FULTON has done along this line in conjunction with MR. ANDREW COURT and other men in General Motors.

One of the things that I have been turning over in my mind in this connection, is *what makes for personality maturity* or personality stability. In other words, to turn the apple over on the other side, instead of asking what is wrong with the person when he becomes a problem, let's think in terms of preventive medicine: what makes this "Joe" over here a good worker?

Recently I read a book by Dr. Leon Saul entitled, "Emotional Maturity," and it started me thinking about this. He lists seven characteristics of a mature worker:

1. The first is emotional independence of his parents. In other words, he has cut the apron strings.

2. He has a fully developed productive capacity. That is, he is able to pull his full weight on the team, and I mean that in the broadest sense, that he doesn't rely on other people to pick him up and carry him.

3. Relative freedom from inferiority, egotism and competitiveness, those characteristics of adolescence which we hope the man outgrows as he becomes older.

4. Sexual maturity in the broader sense, meaning the proper balancing of the need for love that each individual has, with the capacity to love, and to care for a mate and a family.

5. Capacity for gentleness and cooperativeness towards others, with relative absence of hostility.

6. Flexibility and adaptability.

7. A firm grasp of reality, the ability to face the facts and deal with them realistically, instead of retreating, or being over-aggressive. Those two characteristics of either retreating, in other words flight, or being over-aggressive, or fight, are interesting. If you think in terms of the people that you know who are problem cases, most of them show an over abundance of one or the other or both: flight and fight.

We have an illustration of that in one of our departments. It is a light assembly operation where we have a good many women working along with men, and until recently it was done on a more or less hodge-podge basis. Then the engineers introduced a conveyor, which has definitely stepped up production and improved the situation. We found that everyone in this department accepted the change quite willingly, and in a mature sort of way, except for two women. Both of these women showed definite hostility to the change (fight) right from the start, and both of them developed symptoms of *flight* from the situation. They became weak, complained of fatigue, nervousness, insomnia, etc. The foreman sent them to the medical department.

I want to use these cases as an illustration of how one can diagnose a case of this sort. Our big problem is to make *an accurate evaluation of the symptoms and the complaint.* There are a number of approaches we can take.

1. It is important first to evaluate the complaint to *see whether the complaint ties in with the facts that you know.* In the case of the two women assemblers, the complaints were definitely out of line.

2. There usually lies underneath the surface a *latent complaint* that is not at all obvious, but is often more important than the obvious complaint. One develops a knack of "listening with the third ear," as someone has called it, in order to gain an appreciation of this latent complaint. What is the employee's emotional tone? What does he really want?

3. If you think the employee is showing evidence of immaturity in one way or another, it is well to *check the story against the physical findings.* Of the two women previously mentioned, one was a woman of about 45, who was toward the end of the menopause. The clinical examination was essentially negative. The other was a girl of about 30, with a history of thyroidectomy some years ago, with recurrence of a good-sized goiter now. She had palpitation and her heart rate was up. She complained of perspiration and

her hands were dripping. She complained of nervous tension, she had quite a tremor, and as a matter of fact her doctor had advised her to have a second operation. In this case obviously there was something on the physical examination.

4. Next it is important to check the previous history. As I mentioned, in the one instance there was a history of previous trouble that tied in with the present complaint. Frequent injuries in the past, or frequent illnesses, absenteeism, grievances, all those things that make up the pattern of neuroticism, we want to look for in these cases.

5. The fifth aid in diagnosis is *our nurse's observations.* Many of you have been informed by your nurse of the back case who limps painfully out of the department and then as the nurse peeks around the door, dashes to the time clock as fast as he can go. Her observations are very helpful in many ways.

6. The sixth check we can make is *through the supervisor.* The good foreman can always give you a line that is very helpful on these people, whether they are out for something, or whether they are on the level.

7. The seventh is *going out into the shop.* From the angle of checking the facts a man gives you about his job, it is quite helpful actually to go through the operation yourself. This gives great authority as to what the man can do. Another thing you can do is to try to sense *the group situation* that he is in. Is there any tension, for instance, in the immediate environment, the other workers around him? Do you sense any friction between him and anyone else? Try to listen with the third ear out in the shop.

8. It is sometimes helpful to inquire into the home situation. You can ask the man himself. You may get quite a lot that way. Occasionally you can obtain other evidence about the home situation through the personnel department or other sources.

9. Last of all, and also very helpful, is *the response to treatment:* the old story of the back case that never gets well in spite of adequate treatment. In the case of a fellow complaining about gastro-intestinal symptoms, I often give a little phenobarbital as a trial balloon. If he isn't willing to accept the treatment in the first place, you raise your eyebrows. If he fails to respond at all over a period of time and you are fairly certain it is a simple pylorospasm, a functional gastric disorder, then there is something else back of it.

In the cases described above, you will see illustrated the influence of the two important factors, *constitution and environment.* Those two women each had a constitutional reason for reacting as they did to the change in environment. With the one who had the constitutional factor of goiter, after investigation, I felt the complaint was legitimate. In fact she herself asked for a leave of absence for surgery. This was granted.

With the other woman, who was constitutionally neurotic and had a history of menopause, I talked along the line of "Why don't you try it longer and see if you can't make the adjustment? These other folks have been able to; I bet you can, too." That was two months ago and I haven't seen her since.

HERE are practical points to remember in any of these cases that come complaining of psychosomatic symptoms: First, be very sure that you *don't miss something organic.* That goes not only for your gastro-intestinal case with the ulcer, or the fellow with the pain in the chest who is having angina, but particularly watch out for organic central nervous system disease. For example, I was fooled three years ago by a woman who had a rather minor injury to her forearm. She kept complaining of pain in the arm. It involved the forearm and the wrist, then the hand, and then up into the arm and shoulder. She was disabled for quite some time, unable to work, and I wrote her off as a neurotic. But on thinking over the case later I realized that she probably suffered with causalgia. Most of you are familiar with this syndrome of reflex sympathetic dystrophy. But I missed the boat.

Don't forget to watch for *syphilis,* the old masquerader. Syphilis of the central nervous system occurs in various forms with degeneration of the sensorium in the paretic type or evidence of tabes, and so on.

Be alert for the *alcoholic* with damage to the nervous system seen either in peripheral neurititis or in the so-called Korsakoff's syndrome with personality changes.

Keep in mind the *degenerative* disorders, especially in the older age group: simple arteriosclerotic changes which show up in loss of memory or beginning loss, and later in excitability or other mood changes. One also may find neurological signs: changes in deep reflexes, loss of coordination, tremor, and so on.

Also Parkinson's disease. You would be surprised how many early Parkinson's cases go undiagnosed for years, and may show definite personality changes. Some of them develop increased accident frequency because of tremor and slowing of movements.

Multiple sclerosis is a typical example of a number of other interesting neurological disorders. Not long ago one of the nurses asked me to see a young fellow of 25 who complained of nervousness and weakness. He had been treated by his family doctor for a number of months with phenobarbital, etc., "for his nerves." He had a definite coarse tremor. His reflexes were very hyperactive. I tested out muscle strength in his hands and legs, and he showed marked weakness and spasticity. I made a tentative diagnosis of multiple sclerosis. He couldn't continue working, but went to the Veterans Hospital and in five months came back with a diagnosis of multiple sclerosis, quite improved.

Another thing you have to be on your guard with is so-called anxiety episodes. Occasionally you get someone who tends to faint too often or

have dizzy spells, weakness, sweating, etc. These can be characteristic of so-called anxiety attacks, but keep in mind, that once in a while with one of these cases if you do a sugar tolerance it drops to about 40 at which level fainting occurs. There is also the possibility of hyperthyroidism without obvious goiter, and petit mal, which is often not recognized as such. Here the electroencephalograph is a help.

Now as to the handling of these people. Most of you know how to do it, but I thought I would summarize it in an orderly fashion.

(A) First of all, you have to *make certain decisions:* can the fellow safely continue on his present job? If you don't think so, then under what conditions could he continue to work, if at all, and if not at all, then what do you recommend?

Where can we steer him for a suitable source of help? None of us has the time to give to these people that we would like. We have to call on other sources. Sometimes a counsellor in the personnel department can be most helpful. Then there are outside sources of help: the family doctor, or a consultant, or a clinic. For social and economic problems one can contact public welfare agencies, the Friend of the Court, and others. It is well to be familiar with these sources of help, so that you can use them when you need to.

(B) Occasionally you will want to *try simple therapy.* One of the commonest things we use, and use every day, is reassurance. With the typical fellow who worries about his heart, you can do a physical. If he has no hypertension and no other evidence of disease, just a simple dose of reassurance will send him away feeling much better. He may be able to continue working successfully for a long time.

You can also use psychocatharsis: giving a man the chance to talk out what is on his mind, to "spill the beans" to someone who is interested and can listen intelligently. Occasionally along with this you can get a lead as to what the underlying factors may be and how to deal with them. We can't pretend to be psychotherapists but we can sometimes be of help and often of great help.

(C) Frequently you will want to *call in the supervisor and enlist his understanding and cooperation.* In the case of the two women, the key to success with the one who went back to work was the foreman. He is a top notcher and he handled it very well.

(D) You may need *to change certain environmental factors:* if there is something wrong in the environment that ought to be changed, go to bat about it. Not long ago, we had a man, a good, stable worker with several years' seniority, complaining of anxiety. I was surprised. He worked on a so-called straightener machine. The main shaft in our transmissions is a long heavy one, and it goes through a hardening process, during which time slight deviations from the normal contour occur. So they developed the straightening operation to correct those abnormalities. At a certain time, about a month ago, engineering changed the hardening process so that the shafts got brittle. During the straightening operation, a good deal of force was exerted and some of the shafts broke. Fragments narrowly missed hitting this fellow. Naturally he developed anxiety, since he didn't want to lose an eye or have some other injury. I talked to the foreman about it, and they have already under way engineering changes that will take care of it. In the meantime I insisted on his being placed on another operation.

The question of shift changes was discussed at quite some length this morning, and I am very cognizant of the difficulty of changing shifts in a plant. In these cases usually I talk with the foreman, and see whether there is any way he could swing the change conveniently without too much disruption. Once in a while he can, when it is a really worthwhile case, though many times he cannot.

Once in a long while I feel it is necessary to transfer a man to a new supervisor. One case that worked out very well was that of a man who had an elbow injury two years ago. He worked in a department with a fairly heavy operation. The foreman was a good foreman in general but he couldn't understand a guy with a neurosis. The patient developed a fixation on the elbow. He would come up and see me nearly every day, and there was constant bickering and difficulty. Finally I was able to arrange a transfer to the foreman I mentioned earlier. He has done a top job with the patient. I haven't seen him in months, and he is working regularly.

To conclude, I want to make two points. First of all the importance of *the attitude of the doctor.* There is a word for it; it is "empathic"; not sympathetic, but empathic. In other words, the non-judgmental neutral attitude. You can be friendly, you can have a real interest in the man, but you must maintain your scientific objectivity, so you can use your best thinking. Only in that way can you obtain the necessary facts and arrive at an objective diagnosis and correlation.

The second point is to *re-emphasize the importance of thinking in terms of maturity.* It is a helpful way of thinking about those people, who haven't grown up in certain areas of their life. Sometimes you can do quite a little to help them gain insight, grow up and become more useful, successful workers.

Treatment of Common Industrial Injuries

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THE PAPER about to be presented is based upon the results of a questionnaire submitted by DR. E. A. IRVIN, Program Chairman, to the General Motors Medical Directors, listing the topics you would like to have discussed. You have, therefore, designated your own problems, and I hope to be able to assist you in solving some of them.

Hand and Wrist Injuries

FRACTURES in the hand and wrist which are most common and most apt to lead to difficulty are, first, fractures of the proximal phalanges of the fingers; second, our old friend the Colle's fracture; and third, fractures of the carpal scaphoid. In all these, stiffness may follow, and stiffness often constitutes the greatest difficulty we need to overcome. The stiffness in a hand may be due to infection if the fracture has been compounded. Or it may be due to wounds and burns with the associated edema which follows; or it may be caused by any injury, such as a fracture which is not compounded.

In the stiffness which is due to infection, gross scarring, fibrosis in the joints or in the tendons and tendon sheaths, the situation is nearly hopeless. The small muscles of the hand are overpowered and the hand develops a fixed hooked deformity, and very often after months of difficult treatment we end up with an amputation.

The stiffness which is due to wounds and burns cannot be benefited much by exercise, because once again the hand tends to draw into a claw position. However, the situation is not nearly so bad as when infection has supervened. In these cases we should cover the raw area as promptly as possible with a skin graft if necessary. The recommended splint is one which holds the knuckle joints in a fixed position, straight, and permits the other fingers to work against a spring traction, a little loop with an elastic band on it, running out to a jury mast or wire, so the patient flexes his fingers against resistance. This is an excellent device, simple to make and apply.

The stiffness which follows edema in any injury, such as a closed fracture, is one in which our outlook is most optimistic. In these, we must realize that first of all there is an outpouring of serum and serofibrinous material which, for a few days only, is liquid and can be eliminated. After that it turns into fibrinose and then a fibrous deposit, and the area freezes. All our efforts, therefore, should be bent toward getting rid of the edema within a matter of hours or days, not days or weeks. It must be done promptly. This is accomplished by elevation. All injured, crushed, or contused hands, such as roller injuries, etc., should be elevated continuously. Once the patient reaches the point where he can use his fingers actively, we start treating him with physiotherapy and occupational therapy, and, best of all, actual work in the workshop, such as DR. THOMPSON, of Vauxhall Motors, was showing us this afternoon. (See p. 385, herein.)

There is no better exercise for limited flexion, or stiff fingers, than milking a cow, and I have urged upon the Workmen's Compensation Board of Ontario many times that they buy a cow and pasture it out in the back yard. They haven't bought the cow yet, but I am sure there is no exercise better than the old-fashioned milking motion that farmers perform.

The Colle's fracture is a common one, particularly in people over 20 years of age. I like to divide the Colle's into three groups. First are those which are readily reduced and stay reduced. Fortunately, these are by all odds the most common. The measures of a good reduction are two. First, the length of the radius must be restored. The radius is longer than the ulna. We see this in the A.P. view as we look through the fluoroscopic screen. Second, we must tilt the facet forward. This particular facet doesn't face down; it faces 5° forward, and we see this in the lateral view.

LET ME emphasize here, we do not set fractures under the fluoroscopic screen, not for the sake of the patient, but for the sake of the surgeon. Too many surgeons have lost fingers or parts of their hands because of having handled a lot of fractures or a large number of foreign bodies. We set the fracture and then check it with the screen—with the hands behind the back, or with the big 20-pound lead mitts on so we can't possibly burn them. If it is not correct, we shut off the screen, re-set the fracture, and then check it again with the hands safely behind the back.

The second group of Colle's fractures is the one which is readily reduced but promptly recurs, usually being a comminuted fracture. The distal fragment is broken into two or more pieces and the fracture line often runs into the joint. There is never any great difficulty about reducing this type of Colle's; the difficulty is to keep it reduced. As soon as we let go of the fragments and look at it, we recognize that it has slipped, the radius has shortened and the facet tilts down or backwards. These must be held in some manner which will maintain their length, either with a wire through the radius and through the index finger metacarpal, the old Roger Anderson principle, or some similar device.

The third group is the Colle's which is reduced as far as you can tell and stays reduced, but somehow shortens inside the plaster and slips back, losing length of radius. If it is not checked until a month after the injury, one will be chagrined to find that the radius has angled backwards and is shortened. This is the type of fracture we will not detect unless we re-check the patient with x-ray in from seven to 10 days; and it is the kind of fracture that always occurs, in my experience, when treating doctors' wives or other important people.

Those are the problems, then, which I associate with the Colle's fracture.

FRACTURES of the carpal scaphoid are more common than Colle's fractures in young, healthy people. This was shown in the troops, both on this side of the Atlantic and on the other side. When men fell on the outstretched hand, instead of getting a Colle's, they frequently suffered a carpal scaphoid. The only problem with a carpal scaphoid fracture is that it may be missed in the x-ray. The clinical signs of fractured carpal scaphoid are tenderness in the snuff box on direct pressure, and tenderness on ulnar deviation. If those two manifestations are present, even though the x-ray be negative, it is a fractured carpal scaphoid until proved otherwise, and it is treated by putting it up in slight dorsal flexion and slight radial deviation in a plaster that comes down to but does not include the distal joint, permitting the joint to move. The plaster must stop short in the palm of the hand at such a level that it will let the knuckle joints function to a right angle.

Even though the x-ray be negative, every badly sprained wrist is a fractured carpal scaphoid, if the two signs mentioned are present, and must be treated as such. We put them up in plaster. At the end of four weeks, we take the plaster off and x-ray them, and many times a crack will then show up because of the rarefaction at the fracture line.

Then we simply put them up in plaster again for another four weeks.

If carpal scaphoids are missed, about 80% of them will fail to unite, and will therefore go on to a disabling arthritis, or you need to have a bone graft. If they are treated adequately and promptly, right at the start, 96% of them have united in our experience. Therefore, they are well worth treating actively; and by putting them up, even in the face of a negative x-ray, we don't waste the first four weeks, which is a very valuable period.

THOSE, I think, are the chief problems in handling fractures in the hand and wrist. I would, however, like to emphasize again the need for elevation in fractures of the fingers. We splint the fractured finger only, nothing else, no other part of the hand, and we start the rest of the hand moving immediately in order to avoid edema, swelling and stiffness.

Back Injuries

ALTHOUGH the question of low back pain rated high in your questionnaire, this subject will be discussed in some of the meetings to come this week, so we will not put much time on it. However, I should like to emphasize the fact that most back sprains and injuries are not necessarily dislocated or extruded discs They are muscle and fascial in origin, and therefore will yield promptly to the treatment of a muscle or fascial sprain.

In the lower back most injuries are not sacro-iliac slips. That was an old bugaboo which fortunately has been disproved. The sacro-iliac joint is pretty stable. Most back injuries are neither slipped discs nor sacro-iliacs, in fact, those that are slipped discs are manifested by having definite clinical signs and symptoms such as persistent pain in spite of treatment, lost or diminished ankle jerks, and a certain amount of paresthesia down the nerve. These signs, and these only, justify us in diagnosing a slipped disc.

Of the discs which are slipped, most do not need operation. They will yield sufficiently well with conservative treatment. This consists of rest in bed at night on a hard board (a fracture board under the mattress and over the springs), and perhaps changing the man's work so that he isn't constantly flexing and extending the back against resistance. Of the few cases which require operation, we must reconcile ourselves to getting a bad result in all men who are compelled to go back to heavy work. An operation for a slipped disc will be disappointing if a man returns to heavy work. It will be reasonably satisfactory in those who can go back to an office position; otherwise, results will be disappointing.

Knee Injuries

THE injured knees, shoulders and backs are to me perhaps the outstanding headaches in this work. For a moment I want to talk about the rather minor injuries, simply the ordinary twists and sprains of the knee, which cause us such a lot of headaches and bother, ignoring the obvious major injuries such as bumper fractures or fractures of the tibial spine.

There are four common injuries; first, a traumatic synovitis or hemarthrosis, i.e., fluid inside the joint; second, the tear of the collateral ligament, usually the medial collateral ligament; third, a tear of the semilunar cartilage, and fourth, the presence of loose bodies in the joint.

The ordinary sprain or twist is diagnosed by the rather slow accumulation of fluid in the joint. The history of injury is one of a slip or sprain of some sort and a slow swelling of the joint which outlines its capsule accurately. Whenever we find a knee joint which contains fluid, we know it must be one of three fluids, and they are not coffee, tea, or milk, nor are they rye, scotch, or gin. The three fluids which will occur in the joint are either synovial fluid, blood, or pus.

The synovial fluid gathers rather slowly over a period of 12 hours, and that helps in making a

diagnosis. The blood appears promptly within an hour. Pus will give other manifestations of an infectious process, such as high fever, pain, tenderness, an elevated white count, etc.

The treatment for the accumulation of synovial fluid consists in application of a firm pressure bandage, aspiration if there is a large quantity of fluid which will stretch the joint capsule, and quadriceps exercise against resistance.

It is very difficult to make sure that a patient understands what you mean when you tell him to contract the quadriceps. He doesn't understand what you want him to do, so we must instruct him to lift his foot against resistance. This resistance can be increased as time goes on. The quadriceps muscle must be kept in tone at all times, otherwise you get a loose sloppy knee joint and the characteristic picture develops which patients refer to as water on the knee. This is simply due to an inactive quadriceps.

If blood has accumulated as the result of a more severe sprain, it appears within an hour. The temperature may be up, and one must be careful and not mistake it for pus. The treatment consists of aspirating the blood, because it will form fibrin when it clots, and adhesions will develop inside the joint. A firm pressure bandage and a splint should be applied to prevent the knee from moving for about 10 days. During this period once again quadriceps exercises must be started. The quadriceps can waste sufficiently in a couple of days so that one can measure the difference between the two sides in this brief period.

TEAR of the medial collateral ligament is caused by an abduction injury. The patient forcibly abducts the foot, placing a strain on the knee joint, and a tear of the medial collateral ligament occurs, with tenderness over the origin of the medial collateral ligament which is high up on the femur, and posterior to the point where the tenderness in a cartilage is located. There also may be a little hemorrhage and swelling in and under the skin.

It may be impossible to move the joint laterally, but the patient may still have a sprain of the medial collateral ligament and not a complete rupture. Remember, the joint may be stable.

The treatment of these tears of part of the fibers consists in a firm pressure bandage and perhaps a quarter-of-an-inch lift on the medial side of the sole and heel of the boot, so as to take the strain off the medial collateral ligament. If this is done, the injury will recover without any sad consequences in a matter of about three to five weeks.

Once again the quadriceps is kept exercised in order to keep the knee stable.

If, on the other hand, the ligament has been completely torn across, together with part of the capsule, in addition to the above symptoms—tenderness over the collateral ligament, ecchymosis and swelling—one will also find lateral instability. In these cases it is possible to sprain or spring the knee open, and this hurts the patient when it is done.

If only a few fibers are torn, these patients may be bound up in a crepe bandage, and allowed to walk. If, on the other hand, the ligament is completely torn out of the femur or torn across, they must be put in plaster for a couple of months, because this is a much more serious injury. During this entire period the quadriceps of course will be kept exercised.

It is necessary to keep them in plaster a long time, because the ligament can heal together only by scar tissue, and the scar tissue is never as good as the original ligament. It is always capable of stretching, and the knee joint will be a little bit unstable forever after, but this will be handled satisfactorily if the quadriceps is kept in tone.

One of the most common knee injuries is the torn medial meniscus or cartilage. The mechanism of this injury as you know is as follows: with the weight being borne on the leg, a certain amount of rotary movement occurs with the foot fixed; the patient attempts to turn in the opposite direction, and twists the body on the fixed tibia; the cartilage is nipped between the femur and the tibia, and is torn.

The tear is either a bucket-handle shape or the posterior or even the anterior horn may be torn off. The diagnosis of a true cartilage is not difficult, there is a history of this rotation type of injury. If the cartilage is in between the bones or in the intercondylar space the knee will be locked, and, by locked, I mean simply that it will not be capable of complete extension. Any attempt to extend the knee will be painful and tender. The resistance to the complete extension of the knee will be due to this interposed cartilage and it has a sort of a springy rubbery feel.

This is a typical picture which is not difficult to diagnose, and is the type of history and finding we like to get. I remember the last case we had. He came in about two hours after his injury. His foot was caught in the car tracks and he attempted to turn. He was seized with a sudden pain, a tearing sort of pain, and came in with the knee partially flexed. We got him up on the table, found we were unable to straighten the limb out completely, and, within a very short time, a matter of half an hour or so, had him operated on, and the cartilage removed.

TORN cartilages likewise demand prompt and persistent attention to the quadriceps muscle, because the quadriceps will waste here overnight. We begin quadriceps exercises immediately before and after operation on patients with torn cartilages. Start with 10 minutes exercise out of every hour, or better still, get the patient on some sort of machine, so that he will be compelled to contract the quadriceps without realizing he is doing it.

The more difficult types to diagnose are those in which the cartilage is not nipped between the bone, and one has to exercise a considerable

amount of caution and judgment in deciding if operation is necessary.

There is another point I would like to discuss here, and that is the teaching I was subjected to, which is that a slipped cartilage should be reduced by certain manipulations enabling one to straighten out the knee. Then we were told to put them up in plaster for five weeks and hope they grow together and never give the patient any more trouble. Now, the cartilage has no blood vessels, so it cannot grow together again. If it is a bucket-handle tear, through the body of the cartilage, such treatment is simply wasted time. The patient will return later and will then need to have an operation; therefore, he is better operated upon at once. It is true there are a few questionable cases. If the tear is at the outer rim of the cartilage, where it is up against the joint capsule and the collateral ligament, there may be sufficient blood supply to permit healing. I have always felt personally that it wasn't worth the game to hope the injury was one of those lateral tears, because they are rather few in number, and if we waste time waiting to find out if it will or will not unite, we simply are condemning that patient to anywhere from three months to a year and a half of illness and disability, before we go in and remove the cartilage. During all that time, of course, the quadriceps is likely to be becoming more atrophic.

LOOSE bodies in the joint are due to osteochondritis dissecans or degeneration of some of the villus processes or arthritic processes. They are often diagnosed by the patient. He says, "Something slips around in my joint." He knows that it does, and he is correct. If the patient makes such a statement, we had better listen to him. I recall an actual incident, where the patient, a young girl, called us over to the bed and said, "This thing is out; it is right here; it slipped up here," and she put her finger just above the patella. We felt there and could feel a little round knob, smaller than a marble. We got a long straight cutting edge skin needle, sterilized the skin and pushed the needle through the skin, pinning the loose body to the underlying bone. We cut down and got it out through a small half-inch incision.

Single loose bodies are diagnosed best of all by the patient; the doctor can pin them and remove through a small incision. Multiple loose bodies demand wider exposure of the joint, and the danger is that we may leave some in. They then continue to grow and cause trouble later. Therefore, one must be extremely careful to get them all out.

Before we leave the knee joint, I would like to make a few remarks about the patella. A fractured patella is not a broken bone. It is a ruptured ligament, and if it is regarded as such and so treated, we will get much better results. The patella is only a sesamoid bone lying in the quadriceps tendon. It has nothing whatever to do with the bony skeleton, and when the patella is fractured it is really a tear or a rupture of the quadriceps tendon.

If this is kept in mind, at operation we will primarily repair the ruptured tendon, and only secondarily pay any attention to the patella. If we repair the patella and fasten it with catgut or wire or whatever you prefer and pay no attention to the expansion of the tendon on the medial and lateral sides, the fracture will tear again as soon as the patient starts to go downstairs. I have seen that happen, and a man fall all the way from the top to the bottom of the stairs.

If, on the other hand, we repair the ligament, the quadriceps expansion, and never mind the patella—in fact you can take it out and throw it away if you like—the patient will get a good result.

The question of taking out the patella brings us to the indications for such a decision. A fractured patella is either a crack straight across at various levels, or it is shattered. The straight across or transverse crack, is due to the patella being levered over the end of the femur, and may have no separation at all. In other words, the tear may not have extended into the tendon, in which case we can leave it alone, because it will unite all right in the usual time.

If there is separation, which you can feel with the finger, it must be operated on, and the tear of the quadriceps expansion repaired. I don't mind if one wants to put a wire loop through the patella just to make sure there is no roughness on the underneath surface. That is all right, but the primary part of the job is the repair of the extensor apparatus.

If the patient has fallen against a curb or a sharp corner and has shattered the patella, many times it is better to take it out altogether, and repair the quadriceps expansion as well as possible. If we leave it in, the patient will have a rough under surface to the patella, and with such cases it is difficult to get an accurate repair.

It has been shown that the knee joint works just as well or better without a patella, and certainly better in those cases which are shattered than if we had left the patella in.

Ankle Injuries

WE HAVE a lot of difficulty with our old friend, the sprained ankle, and one of the topics listed by you was sprained ankles without fracture. I am not going to talk about fractures in the foot, os calcis, talus or the lower part of the tibia and fibula. Sprained ankles without fracture divide themselves into two groups. First, those in which there is a partial tearing of the external supporting ligament of the ankle joint, just a tearing of a few fibers. That is the ordinary common or garden variety of sprain. And, second, those in which there is a complete tear of the middle and perhaps the anterior fasciculus of the ligament—and of course with such an injury there has been a dislocation of the ankle joint, a displacement of the talus from its mortise. Dislocation may have been only momentary,

and it may be completely reduced by the time we see it, but it is essential to differentiate between the two, because the patient with an ordinary sprained ankle should not be kept off his feet, whereas one with a dislocated ankle with a complete tear must be kept off his feet.

The ordinary slight sprain is well treated by any one of half a dozen methods, so long as we don't take the man off his feet—so long as we keep him on the job. Bind it up with elastoplast or crepe bandage or inject novocaine at the site of the injury. We have treated a great many of these since the middle of the war by simply spraying the area, which the patient will pick out for us, with ethyl chloride. We ask the patient to find the tender spot; he will put his finger on a small spot no larger than a dime; and we spray it with ethyl chloride until it is frozen white. The patient usually complains, maybe we simply distract his attention from the sprain to the frost bite, but in any case it works. After it thaws out the skin turns bright red or pink, and we tell him to come back the next day for a re-check. Most of them do not need any further treatment; one spraying with ethyl chloride is sufficient. They can keep right on with their work.

If the patient comes back the next day and says it is still sore, we ask him to find the tender spot, and he will usually designate a spot which has not been sprayed before. This is a second tear in one of the other fasciculi of the supporting ligaments, and is in turn treated in the same manner.

Now I don't care which of these methods we use on these cases. It doesn't matter. We will get a good result with any of them. If, however, the talus has been dislocated, then we are up against a different proposition. Persons suffering from such an injury will go through the rest of their life talking about a weak ankle, saying 'I sprained my ankle when I was a kid and have had a weak ankle ever since.' The only way to diagnose them, that I know of, is by x-ray with the foot forcibly inverted. Take hold of the foot and try to dislocate it, then x-ray it—an AP view, with the os calcis and the talus inverted as forcefully as we can. If the talus still fits in its mortise, and if the joint spacing all around is equal, then it is not dislocated, the ligament hasn't been torn.

If we are able to turn it so that the angle of the talus is a little different from the angle of the lower end of the tibia, and if the joint spacing on the different aspects of the talus is different, then it is a momentary partial dislocation of the talus with a tear of the ligament. This must be treated for 10 weeks to three months in plaster in order to permit the ligament to grow back together again by the only means it knows how, namely, fibrous tissue. It will never be as good as before, but it will be a lot better than if we fail to treat it in this manner.

Tendon Injuries

BRIEFLY now let us take up the question of tendon injuries, cut tendons. There are several principles in the treatment of these. The first principle is to recognize a cut tendon. It is necessary to mention this, because many times a patient comes in days or even weeks after a small cut and the doctor is somewhat upset to find that a small cut in the skin has resulted in an inability to move certain joints of the finger. The cut may lie at a considerable distance from the original skin wound. I remember one man who jerked his hand back to get away from a machine or some hot material on the bench and nicked the back of his hand and wrist against a quarter-inch chisel. He had a quarter-inch cut over toward the ulnar side. He had cut the extensor of this thumb, two inches away from the site of the skin laceration.

Second, having recognized that a tendon is divided, we must find the ends, to put together again. Now that sounds so obvious one hardly need mention it. If the tendon is not immediately available then it should be searched for, but not by poking into the wound with a snip or a forcep and attempting to pull it down. The wound should be enlarged by opening it up, proximally and distally. The skin flaps should be turned back, and the tendons located accurately and gently as they lie in the tissues. If one has a cut across the wrist, where perhaps we have eight or 10 loose tendon ends sitting there looking up at us, then we must accurately identify them and sew the proper ends together; otherwise, they don't work so well. If we locate the tendon ends before we disturb them, we are more apt to find them in their proper relationship.

The upper ones are the sublimus and the lower ones are the profundus, and they are in the correct order, so we simply fasten them together as they come, taking care not to carry out what Dr. Henry Marble refers to as the classical operation. This is done so often in Canada and the United States and even in Boston where he comes from, that they have come to call it the classical operation, especially when speaking of it in the presence of the patient. The classical operation is to suture one of the cut ends of the tendon to the cut end of the median nerve. Neither one of them works very well. It is not irretrievable, you can undo it and perform some less classical operation, but it is not desirable.

Having found the tendons, we must repair them. That is, we must fasten them together, and this is done by one method of suturing or another. I haven't time to go into the different techniques of suture, except to say the third principle of repairing tendons is to fasten them so they will stay fastened. It is necessary to mention this because all too often they pull apart, and the reason they pull apart is either that the wrong suture material was used, or that the suture material wasn't strong enough, or that the suture material wasn't put in the tendon properly, and pulls out through the tendon fibers.

I like to divide suture materials into three classes—good, fair, and bad. Good suture material is stainless steel wire, braided nylon or

braided silk. Fair suture material is linen and cotton. If anyone from the South is an advocate of these and wants to advance the sale of cotton, I don't want to discriminate against the South, so we will keep cotton, although I don't like it because neither cotton nor linen has the same tensile strength as silk or nylon for the same size. The bad suture material is catgut, of course. Catgut sutures are all right around the Achilles tendon because we can tolerate a certain amount of fibrous adhesion there, but not in the hand. Fibrous tissue around the sutured tendon means that the tendon will never move; around a nerve it means it will never conduct impulses again. Because of subsequent formation of fibrous tissue we cannot tolerate the slightest hemorrhage in the region of a repair of this sort.

Having sewn the tendon together so it will stay together, the fourth principle is to make it work, and that we have already had discussed today, so I will not go into it any farther, except to point out that the tendon must slide or it will be of no use sewing the ends together.

OF COURSE, the worst place of all for tendon injuries is across the proximal phalanges of any of the fingers, inside the tendon sheath, and the results here are bad no matter who does it and no matter what technique or suture is used; whether it is the stainless steel pull-out stitch, a shoelace stitch or the lateral loops, it doesn't matter, they are all bad. That is why we are resorting to all these other tricks such as taking out the entire distal part of the tendon and slipping the other down from the muscle part, so that we have no suture line opposite the cut, we insert the cut end down into the distal phalanx and so on. I regret I haven't the time to go into all the phases of this problem.

Occupational therapy and the workshop are the best weapons against fixation of the tendon after suture Before closing I would like to mention one other point about severed tendons. They are recognized, not by seeing the cut ends of the tendons, but by testing the joint to which the tendon goes. If the joint doesn't move, the tendon has been cut. We don't even need to see the wound. Then if the facilities for the repair of the tendon are not good, one should never apologize for simply closing the skin and postponing the repair of the tendon, any time up to a month, if necessary. Just say, "I closed the skin by primary suture and I know there is a cut tendon or nerve underneath it." It is perfectly good orthodox procedure, and gives one an excellent chance to get a good result, perhaps not quite so good as a primary suture, but certainly very good.

THOSE, I believe, are the chief items which you listed in your questionnaire. I have run over them quickly, mentioning the stumbling blocks which have occurred most frequently in my experience. It is hoped my methods for handling these problems will be of some value to you in your work.

Left to Right: Dr. E. A. Irvin, Cadillac Motor Car Division; Wm. M. Walker, Jr., Director of General Motors Central Office Personnel; and Dr. P. B. Rastello, Ternstedt Division, Detroit. Mr. Walker was General Chairman of the Conference, and Drs. Irvin and Rastello comprised the Program and Invitation Committee

Common Problems in Industrial Ophthalmology

CECIL W. LEPARD, M.D.,
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FOREIGN bodies in the eye constitute a major problem in industrial ophthalmology; rightly handled the job may be over with the whisk of an applicator, wrongly handled an eye may be lost. Our problem is first to find and remove the foreign body and second to preserve eyesight by preventing infection and corneal scars. Every hospital should have a plan of standard directions for the nurse, intern or new member of the staff to follow. It should be brief, yet cover the essential points. There is one factor to be kept in mind. The incidence of ocular foreign bodies in industry is in a direct ratio to the newness of employees to their jobs. This is where job training becomes important. Job requirements are emphasized and eye protection is demonstrated. There are other factors; one is that caution is a part of maturity, and the lack of it is part of youth.

WHAT are the steps in removal of a foreign body in the cornea?

First, a history is important. You see them first when their memory is good and this is the time to get in "black and white" exactly what happened. Late histories are too often colored by what the patient wants to remember, when the question of compensation arises. In the record, always state the type of foreign body and from what part of the eye it was removed.

Second, anesthesia of the conjunctiva and cornea in order to obtain easy manipulation of the lids and permit excursions of the globe. The use of ½% solution of pontocaine is adequate for this and for the removal of the foreign body—not 1% or 2% for it is too irritating. Do not use cocaine because of its tendency to cause drying or changes in the epithelium.

Third, finding the foreign body. The cornea and anterior segment should first be inspected with a magnifying loupe. If it is not there, the next most likely place is in the sulcus just above the lid margin, seen when the upper lid is everted. If they are dark or black, identification is easy but if white it may be very difficult. Remember that foreign bodies may lodge anywhere. I remember finding several strands of steel wool in the upper fornix. That is where larger free foreign bodies seem to prefer to stay. Small foreign bodies work downward to the sulcus. Generally speaking, those with little spines or sharp hooks stick where they strike the eye. Many times a patient will come in with a typical history and sensation of a foreign body. Examination reveals none but if you stain the cornea with fluorescein a minute area of epithelium will be shown to have been lost.

Many people will come from industry and other occupations with the complaint that they have a foreign body in the eye. After being examined by the slit lamp and in every other possible way, no foreign body or abrasion of the epithelium is found. This may be repeated over and over until somebody finds a low grade conjunctivitis in which there are one or two large hard follicles which cause this sensation. These scratch the epithelium of the cornea as the lid winks and the patient is sure he has a foreign body. Ocular allergies may be the cause of this and a change in the occupation or job may be necessary. Other causes of this sensation are low-grade meibomanitis, concretions of the conjunctiva, a small chalazion, the small white lash growing inward, or sometimes a lash in the canaliculus which may protrude through the punctum. If you question the patient's complaints, see if a drop of pontocaine decreases the sensation of a foreign body. If it does not, another problem is presented.

JUST as there are many points in the eye where a foreign body may stick, so are there many types, sizes and velocities of foreign bodies. A piece of steel 1.0 x 1.0 mm., if going at a high velocity may pass entirely through the eye while a much larger one at a low velocity may be stopped by the cornea or sclera. If an intraocular foreign body can be seen or suspected, take a flat plate x-ray; an ophthalmic surgeon should then be consulted. If seen early, it can often be extracted through the route of entrance by a magnet. The degree of damage varies greatly. Those passing through the ciliary body or through the posterior segment of the eye are more dangerous than those through the cornea or lens. When the damage is great, immediate enucleation may save the patient time and discomfort and eliminate the ever-present danger of sympathetic ophthalmia.

Small spicules of glass may go into the cornea. If these, or if any foreign bodies are deep in the stroma near Descemet's membrane, the trick is to remove them without entering or pushing them into the anterior chamber. If all the tiny fragments cannot be removed, one may have to wait until they appear nearer the surface of the wound and then pick them out. Corneal glass may be irritating because of the low-grade inflammation it sets up and because it reflects light entering the eye.

Pieces of lead in the eye are often extremely irritating and often produce considerable destruction. Non-magnetic alloys, lucite, plexiglass, brass and copper are very difficult to remove, and if the eye is quiet they are better left alone. However, individual tolerance to these substances varies greatly and one must judge accordingly. For example, I know of a man who has carried

a lead shot in his vitreous for over 15 years with no reaction whatever. Ophthalmologists from the copper country have reported a remarkably good tolerance of the eye to copper in the posterior segment.

Fourth, removing the foreign body. Before removing the foreign body, irrigate the conjunctival sac with saline to minimize the danger of infection. In handling foreign bodies imbedded in the cornea, we remove them with the least amount of trauma possible no matter where they are, but those in the central one-third, if a scar is produced, may cause impairment of vision. Therefore, the removal of those in this area should never be trusted to nurses or the intern who has just come to the eye service. Remember again, there is only an area of 5 mm. necessary to give a person good vision. The more you go below Bowman's membrane, the more you are likely to have a scar formation. There is no tissue in the body capable of regeneration more quickly than corneal epithelium. In connection with this, I should like to quote experimental work with the prolonged use of corneal anesthetics. In every anesthetic tested, epithelization of the cornea was delayed as compared to those where no anesthetic was employed. In other words, the less anesthetic used the more rapidly epithelization occurs. Do not give a patient an anesthetic to take home —ointment or drops. If the denuded area is large, I prefer to bandage the eye tightly, the use of ice compresses, sedation, and in some cases M.S. rather than allow him to uncover the eye and use anesthetic drops or ointment because the whole healing process is slowed up without the bandage. The pain will be over or nearly so by the next morning when he wakes up if the dressing is left in place.

In order to remove a foreign body, you must be able to see it well enough to determine how deeply it is imbedded. Ideally, a slit lamp should be available. If it is not, you can, with the aid of a +10 loupe and good illumination, see almost as well. This lens has a very short focal distance and must be held about one inch from the eye. When its position is determined, the usual binocular loupe can be used for adequate manipulation. Deep foreign bodies well in the corneal stroma present the greatest problem. For these a corneal microscope is best, otherwise too much corneal tissue is damaged. If necessary, a cataract knife is used to cut down on the foreign body and then it can be extracted by either the large magnet or needle forcep. For more superficial foreign bodies, I prefer the sharp pointed spud (curved cataract needle) because it is easier to get beneath and lift the foreign body out (a hypodermic needle may be used). Others prefer the golf-club type or more blunt point. In using either, do not scrape the epithelium. A large denuded area is painful and often results in delayed healing as well as a greater chance of infection. Even though we think we have removed only the foreign body, there is always the tendency for epithelium around the foreign body to soften and lift off, possibly encouraged by local anesthetics acting on the epithelium. In these cases it is usually necessary to strip this away and treat by touching this area with Lugol's solution and cocaine and then applying a tight bandage for 24 to 48 hours. If not handled this way, recurrent bullae of the cornea may occur weeks or months later.

Occasionally, a ring of stain remains after the removal of a metallic foreign body. I am convinced more harm than good is done in trying to remove this on the first day, if there is difficulty in doing so. Wait 24 hours or longer and you will find the tissue containing stain has softened and can be much more easily removed. It is true in these cases that a larger area must be treated possibly by iodine or cautery application, however, I would rather do this than to destroy too much tissue at first. Stain will always work itself to the surface and be sloughed off eventually.

Picture the anatomic attachment of the iris base and ciliary body to the region of the corneoscleral junction and remember than an insult to the cornea may cause ciliary irritation and some secondary iritis. If slight, this may be relieved by 4% homatropine to relax ciliary spasm; if more marked, 1% atropine for a few days may be required. Iritis is painful and may be present even though the corneal wound has healed.

If the ocular injury is more severe, that is, lacerations of the eyelids, conjunctiva or globe, instill pontocaine anesthesia, cleanse the skin with green soap, irrigate the conjunctival sac with saline and put in two or three drops of one of the antiseptic solutions (do not use ointments in perforating injuries). Then apply an eye pad firmly and send to the eye surgeon.

CARE after removal of a foreign body in the cornea consists of irrigation of the conjunctival sac with normal saline to remove mucus and tiny foreign body fragments, and again to minimize the danger of infection. It has been reported that cultures of normal conjunctival sacs show 97% to contain non-pathogenic bacteria. Our chances then are about 97% that we can avoid infection, but we have to plan our treatment for that 3%. The most vicious killer in this group is B. pyocyaneus. First, it lives in dirt and contamination and may be dormant in the fluorescein bottle or in other solutions just waiting for a chance to attack denuded cornea which it likes best. Growth in the broken epithelium is rapid and a grayish exudate appears in the area early with considerable discharge from the conjunctival sac followed by inflammatory changes in the entire anterior segment, with the resultant pain. The one hope of stopping this infection is early identification of the organism. If you wait for culture reports from the laboratory, it may be too late because the infection may spread into the anterior segment of the eye. If on taking a direct smear from the cornea, short gram-negative rods are identified it is the signal to begin treatment. We have saved eyes in the past by

large doses of sulphapyridine. More recently favorable results have been obtained by the use of streptomycin and aureomycin. Other common offenders in the 3% group are the streptococci, pneumococcus, hemolytic staphylococcus, meningococcus and B. subtilis.

Now what are you going to do to prevent infetion by these organisms? Some men cauterize the area from which the foreign body has been removed with 1 or 2% $AgNo_3$. If you do this, do not later instill sulfathiazole ointment because a more or less permanent white precipitate will form in the cornea in this area. I feel that cauterization causes necrosis of the area, and I believe that it is better to instill an antiseptic drop or ointment than to cauterize. Generally speaking, the *gram negative* rods and cocci are more susceptible to streptomycin and aureomycin while the *gram positive* organisms are better treated by the sulpha group. Since we do not know what organism may be there, best results would be obtained by using 5% sulfathiazole ointment or Na sulfacetamide drops because these cover a greater number of bacteria. Avoid using penicillin if possible; notice that the anesthetic ointments have not been included.

These medications are recommended for one instillation only after the foreign body has been removed. Always keep in mind the possibility of drug allergies. I am sure we are seeing more ocular allergies of all types these days than we were 10 years ago. A patient may become sensitive to any of the above mentioned drops or ointments. This may show itself in the conjunctiva, cornea or eyelids in a more or less severe reaction. Always err on the side of under-treatment rather than too much medication. Remember the constant flow of tears provided by nature may be the best antiseptic eyewash.

Small corneal abrasions do not require a pad. Larger ones or those not healing in a satisfactory manner are often better padded. If your nurse puts on a pad which will soon come loose, or if it allows the lids to open beneath the pad you might better not put one on at all. Pads should fit under the orbital rim. On those whose eyes are deeply set, two pads are often necessary. These are firmly fixed by two or more strips of adhesive or scotch tape from the upper forehead to the malar prominence, so you are sure the lid cannot open or the pad become loose. Occasionally a head bandage is necessary.

ACID and alkali burns in the eye are the most painful and can cause the most serious loss of vision of any of the industrial accidents. We have so little to offer other than symptomatic treatment. The damage is usually done before you see the patient. It has been recommended that fountain-type drinking outlets be placed near areas where acids and alkalis are used so that in case of accident, employees may irrigate their eye directly with cold water before going to the first aid. The eye itself has its own protection in the excessive flow of tears, diluting any such substance in a lightning reflex action. What we do is usually a comparatively late and weak supplement to this. There is, however, one instance where bits of lime may remain in a burned area long enough to allow treatment by the use of ammonium tartrate, which will combine with it forming calcium tartrate, neutralizing its penetrating effect. When first seen, these patients should have irrigation with copious amounts of saline, then if there is congestion, epinephrine drops every five minutes, ice compresses, pontocaine or holocaine ointment and sedation. If severe, it is a problem for an ophthalmologist.

Infra-red and ultra-violet radiation are largely absorbed by cornea, aqueous, iris and lens. Only in instances where the source of ultra-violet light is very small (the sun) is the concentration of rays sufficient to penetrate through to the retina, usually at the macula. Larger light sources, flash-welding for example, are absorbed or dispersed sufficiently if they do reach the retina, to do no harm. However, most severe reactions to these rays do occur in the cornea, iris and conjunctiva. A single flash usually causes edema and hyperemia of the anterior segment with temporary photothalmia. Less severe burns are relieved by pontocaine ointment in .05% solution which may be repeated several times a day, ice compresses for 15-minute intervals, and sedation. In more severe cases, the height of the reaction may be 24 hours after exposure and result in damage to the epithelium and iritis. These are best handled by the ophthalmologist.

The resultant action of infra-red and ultra-violet light differs upon the crystalline lens. Characteristic cataractous changes are found in workers exposed to reflected infra-red radiation while cataractous changes resulting from exposure to ultra-violet rays are almost unknown.

Infra-red penetrates plain glass with ease but the addition of iron offers good protection. The Crookes lens is of this type. Plain lenses absorb a part of ultra-violet light but cobalt lenses are recommended for protection if the intensity of radiation is high. In addition to the high degree of ultra-violet light is added another factor—that of an intense degree of visible portion of the spectrum as encountered by the arc welder. It would seem that dark lenses would also be indicated for protection against these rays as well.

THE story of safety glasses is a brilliant record of sight-saving and accident prevention. In spite of all we can do, there are many who will not wear safety goggles because they think they are protected by some unseen hand. I am a member of the Board of the Detroit Society for the Prevention of Blindness and can assure you that every member is well aware of the part industry has played in the prevention of eye accidents. It is a large part of the work of this society to broadcast to the public by lectures and literature, the importance of taking advantage of protective glasses and devices in saving eyesight. The prob-

lem as I see it is not in the value or type of safety glasses but in making the worker and public as well more aware of the need for them. In other words, how are we going to make the employee wear his glasses? First, by having him measured and fitted for safety glasses or goggles at the time he is employed for jobs where such protection is indicated—more specifically, at the time he takes his visual examination and is found qualified for the job. If prescription glasses are indicated, be sure a recent refraction has been done. This man then goes to his job protected from the start. Such a rule should also hold when he is transferred to jobs requiring protective lenses or goggles. Second, workers rightly do not like to wear ill-fitting, partly broken, or poorly adjusted frames. I understand that many plants provide the services of an optician with necessary equipment to make periodic rounds for providing these services.

IN DISCUSSING minimal visual requirements for various jobs, I should like to review the report of the Committee on Compensation for Eye Injuries which was adopted by the Section on Ophthalmology of the American Medical Association in 1925. Distance and near-visual acuity are expressed in percentage of acuity rather than by Snellen notation and the combined efficiency of one eye with the other is then computed according to the formula as recommended by this committee. Two figures are thus arrived at—the combined visual efficiency for distance and the combined visual efficiency for near as expressed in percentages. I would call your attention to the fact that a man may have 20/20 in one eye and 20/50 in the other, yet his combined visual efficiency for distance, disregarding muscle balance and color perception, will still be 94%.

So many factors enter into a man's efficiency. One of the most important is whether or not he does close work and if so at what distance. Work at 10 inches would require a much higher visual acuity and a much more nearly perfect muscle balance than work at 24 inches. There are only a few occupations in the automobile industry where color perception and discrimination would be required, while railroad employees are held to strict color discrimination standards.

In theory, color perception should be required by vehicle operators. In practice, it is usually not required since most color blindness is congenital and by the time the individual is old enough to operate a vehicle he has learned to distinguish saturated colors by shading. To my knowledge, no States require an applicant to be color perfect for an operator's license. A person who has suddenly lost his vision in one eye even though the other is perfect would be substandard in this group for the reasons that he has suddenly lost his depth perception and has had a suddenly marked loss in his visual fields. On the other hand, a man who has 20/20 in one eye and 20/200 in the other since birth from a congenital amblyopia may have normal peripheral fields and not be handicapped in judging distances because he has learned to do this since childhood.

I mention these various things because a consideration of all the factors involved must be given in setting up visual requirements for various jobs. Far and near visual acuity are most important in examining applicants. I should think that only applicants for those jobs requiring color perception and muscle balance should be given these tests. In evaluating the results remember to think of the man as an individual, for, as someone has said, "you are not hiring eyes—you hire function as a whole."

(1025 David Whitney Building)

What the Health Maintenance Program Means to an Operating Division

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MY FIRST experience with any kind of medical service in a manufacturing organization occurred some 30 odd years ago, at the time of the first World War when I worked in a munitions plant during a high school vacation period. I started out as a helper on a punch press at 17½ cents per hour and later was promoted to the job of storekeeper. When they turned the job of storekeeper over to me, there were three bottles on the desk containing iodine, alcohol and carron oil, as well as some rolls of bandages and absorbent cotton. This was the only medical department in the whole plant. I bound up a lot of cuts, scratches and burns, and, while this was a metal working plant and quite hazardous, fortunately, I did not have any serious accidents with which to contend. Since that time industrial medicine has made tremendous strides, although I dare say there are still some plants in the country which have very primitive facilities for maintaining the health of employees on the job.

THIS evening I will endeavor to give you a picture of how the General Motors health maintenance program functions in the Fisher Body Division. Today, we maintain hospitals in 23 plants. We have 19 physicians, practically all of whom are on a full-time basis. We also have approximately 65 nurses and other attendants in these plant hospitals.

The health maintenance program of Fisher Body is concerned, first, with a thorough examination and proper placement of all applicants for employment, secondly, with the care of all industrial injuries and occupational diseases, and, lastly, with the care of minor illnesses and emergencies among employees remaining at work and consultation and advice concerning their personal conditions. We endeavor to help every individual who seeks advice from our medical departments. Our program emphasizes the periodic examination of production employees and the periodic examination given individuals in certain hazardous occupations. It includes the over-all control of industrial hygiene hazards and particularly of lead which is a hazard characteristic of automobile body building.

During the year 1948 there were 728,000 visits to our plant medical departments. Of this total, 164,000 were employees on account of personal illnesses and 51,000 on account of personal injury. By this I mean injuries incurred outside of the plant. For this same period we spent $631,000 on our medical program. This does not include fixed charges such as depreciation, insurance, taxes, etc., on the plant and equipment used by our plant hospitals. Our hospitals are not elaborate, but they are well equipped and well maintained. All of them have excellent x-ray installations and other equipment for the treatment of injuries and illness.

The Fisher Body Division has built and painted over 20,000,000 bodies. Up until 1935 the base coats of the paints we used contained a large quantity of lead. However, by constant supervision of working conditions, frequent examinations of exposed employees and the substitution of wet sanding processes for dry sanding, illness from lead poisoning was practically nil. In 1935, at the suggestion of our medical department, the use of paints free from lead was instituted. This eliminated the possibility of lead poisoning from our painting operations.

With the development of the turret top and all-steel body, solder containing a large amount of lead came into extensive use in our body building plants. In metal-finishing the soldered joints economically, power-driven abrasive discs are used. These tools develop quantities of finely ground solder dust. Our medical department undertook active control of the exposure of our employees to this hazard and recommended the use of "in-draft" discing booths. These booths segregate the men working on this hazardous occupation from the rest of the employees on the body assembly lines. To protect the employees working within the discing booths "supplied air" helmets are provided, thereby insuring the operator a supply of pure air, even though he is working in a dusty atmosphere. Our program for the control of solder discing is a major activity affecting, as it does, many hundreds of employees in our assembly plants. Exposed employees are given physical examinations at monthly intervals, supplemented by laboratory examinations of blood and urine. During 1948, 5,257 such occupational physical examinations were made by our plant physicians. On-the-job analyses of air in areas surrounding hazardous operations are constantly being made.

Problems arising from the use of lacquers in the painting of automobile bodies have been successfully dealt with over the years. The presence of solvents in the lacquers to which a large number of spray men were exposed has required the careful observation of a large number of these men over a considerable length of time. A constant check is maintained on the kind and type of solvents and other materials in our lacquers and paints. Our medical department maintains liaison with our material supply sources to control industrial hygiene hazards. They ascertain the formulas of all paints, solvents, polishing compounds, etc. This enables the medical de-

partment to observe exposed employees and make the necessary arrangements when laboratory analyses are required and to suggest remedial measures for the elimination of hazards.

OUR Division has been conducting physical examinations on new hires since 1924, and we have been making periodic physical examinations of hourly-rated employees since 1936. In 1948, 40,124 physical examinations were made. The medical department does not accept or reject employees as a result of the physical examination but advises the personnel department as to the outcome of the examination. The personnel department acts on the advice of the examining physician. This is done for a very specific reason, as we do not want any member of our medical department to become involved with the union regarding the physical ability of an employee adequately to perform a given job.

The doctors, nurses and first aid attendants in medical departments can play a tremendously important part in our employer-employee relations. They are engaged in rendering a service to employees, and the kind of service they render will be reflected in our employees' attitude toward the company. This also has an impact on the safety program, as employees are more ready to report small injuries which might result in infection, if the environment of the plant hospital is friendly and helpful.

Every contact which we have with our employees gives us the opportunity to get a message across to them. This works both ways, of course, as it also gives the employees an opportunity to express their thoughts to us. When you consider that we, in Fisher Body, had three quarters of a million such opportunities during 1948 from approximately 50,000 employees, it becomes a worthwhile avenue of communication.

I appreciate the fact that to take full advantage of these contacts the people in our medical departments must have the time to devote to this activity. The work loads in our medical departments for the past several years have been heavy, owing to the high rate of turnover we have experienced. The high employment in the country today is responsible for this condition, as people leave jobs quite readily when jobs are easy to get. In some plant cities we have had considerable difficulty in securing enough people to meet our production schedules. Breaking in new people invariably results in more injuries, which means mroe work for the medical department. Add to this the time spent in giving new hires a physical examination and you can readily see the cause of the increased work loads. Nationally, the trend in employment in recent months has been downward. This should have a stabilizing effect on our work force and should lower the work load in our medical departments.

ABSENTEEISM is one of our worst problems today. Currently, it is averaging around 4%. This means we must carry on our payrolls about 2,000 more people than we actually need. The most frequent reason given for short term absence is illness One of our plants found that 70% of the employees gave illness as the cause of repeated short term absence, and that 6% of this 70%, or 4.2% of the work force, was responsible for 27% of the total days lost due to illness. Undoubtedly some of the people in this group have underlying physical conditions or diseases which could be improved by treatment. Plant medical departments may make a considerable contribution toward the welfare of employees and the improvement of absenteeism by advising such individuals on the proper course to follow to correct their condition.

Our product is made up of two things—materials and labor, the human relations factor. We are very particular about the materials that go into our product. Specifications are written to control their quality, and it is a comparatively easy job to determine if they measure up to General Motors standards. This would also apply to the physical plant and equipment used in our manufacturing processes. But even with the finest plant and equipment and the best materials available, we could not make an automobile if we did not have labor. The procurement of this necessary part of the manufacturing equation rests with us. I do not think that we can overemphasize the necessity for hiring employees who are physically and temperamently fitted for work in our plants. The many troubles which we are plagued with daily in the production of our new models stem mostly from the labor side of the picture and not the materials side.

Experience has shown that physically fit and mentally healthy employees, as a general rule, have better dispositions and more even temperaments. These things make for better workmanship, which in turn produces a better product. You are all familiar, from reading the daily papers, with the slow-downs and wild-cat strikes which are besetting other manufacturers today. These troubles stem from the labor side of the manufacturing picture. True, we have our occasional difficulties and I have kept my fingers crossed on more than one occasion, but in the main, General Motors does not have anywhere near the same number of these incidents as the rest of the industry. We can do an ever better job than we have in the past by making sure that when an individual is approved for employment he is physically and temperamentally qualified to make a good employee for General Motors.

THE maintenance of a healthy work force is also a very important part of our job. The General Motors Health Maintenance Program Minimum Standards state that, "Periodic examinations are to secure diagnosis of preventable diseases and adjustments in occupation if such be necessary. They should be as complete as a doctor's judgment indicates and they may be made as often as required to give the employee adequate health protection. It may be that ex-

aminations made on transfer, re-entrance and during consultations will serve this purpose. If so, they can be credited as being periodic examinations. If there are any employees who do not have the benefit of these in any one 12-month period, they may receive a routine periodic examination."

Human beings are funny creatures and, as you all know, there are a lot of them who don't want to go to a doctor for an examination simply because he may find something wrong. They proceed on the theory that what they don't know won't hurt them. There was a time when people took their automobiles to a garage only when there was something wrong. Today, people are educated to take their cars in fairly regularly for inspections and minor adjustments, with the result that present-day cars give many years of trouble-free service. I know you will say that cars are better built now than they were years ago, but I think that is true of people as well. I don't mean better built. But better care is exercised from the time a child is born and up through school, as is evidenced by the increased life span of individuals. The point I am trying to make is that people should be educated to lead healthier lives and to obtain periodic examinations so that the necessary adjustments and corrections may be made from time to time.

When you consider that only slightly more than 50% of the people in the management group take advantage of the annual periodic physical examination which the corporation offers to them free of charge, you realize how little thought some people give to their physical well-being.

My purpose in making these observations about periodic physical examinations is to highlight the necessity to educate people to take care of themselves, whether it be through the medium of the plant physician or the employee's family doctor.

Down the road our health maintenance program will be in competent hands if we have well trained industrial physicians who have decided to devote their lives to industrial medicine to fill the vacancies which are bound to develop from time to time. The corporation has a program for training young physicians in industrial medicine, and we in Fisher Body are very happy to have a part in this worthwhile training program.

IN CLOSING I want to point out again the tremendously important part you men can play in the improvement of our employer-employee relations through the many contacts you have with the men and women of General Motors. MR. SLOAN said some time ago that ". . . . a business enterprise like this is comprised of people and facilities and opportunities. The people are our real asset —the people are what make General Motors organization and business different from others. The facilities that we have are common to all; they can be bought by anybody that has the money. But the people are the real asset. That is where the opportunity to do a bigger and better job makes General Motors, or any other institution different from others."

Carl Moyer, General Director of Industrial Relations, Fisher Body Division

Engineering Methods in Occupational Therapy and Industrial Rehabilitation

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IN GREAT BRITAIN the conservation of manpower both during and since the Second World War has assumed a position of importance in the national economy, and for this reason the subject of rehabilitation has attracted considerable attention.

Broadly speaking, two main groups of individuals are concerned; those with permanent disabilities for whom legislation under the Disabled Persons Employment Act has provided excellent residential centers for vocational training and placement within industry, and those temporarily put out of action by injury or disease. It is with the latter group that this paper is chiefly concerned, for while much can be done for the permanently disabled, the problem of the short-term disability, from whatever cause, awaits solution and offers an attractive field for investigation and research.

In the field of British industry alone the problem is one of major importance. In spite of educative and preventive measures, 30% of all accidents are sustained in work and account for half a million casualties annually at a cost in manpower wastage which has been estimated at 70 million pounds sterling each year.

While convincing proof of the value of modern rehabilitation methods was only widely appreciated under the stimulus of war, the application of these methods to the industrial environment is a postwar development of great promise and one which need not necessarily be confined to the purely works accident case. The speed of recovery is largely determined by the efficiency of first treatment and after care, and for this reason an efficient accident and rehabilitation service should form a part of every modern industrial medical department. The effectiveness of such a scheme, however, will depend in large measure on a close working liaison with enlightened hospital and general practitioner services prepared to accept new standards as to fitness for modified or selective work based on some first-hand knowledge of what goes on within industry itself. Above all, no such scheme can operate satisfactorily without the willing cooperation of the patient, and in this respect good labor-management relationships and a high morale among the workers themselves are of fundamental importance.

Conceived in 1945 and sponsored by an enlightened directorate, the Vauxhall rehabilitation scheme serves a community of some 12,000 people, 9,000 of whom are manual workers engaged in the manufacture of motor vehicles. The scheme, which has been in operation since April, 1946, functions through the medium of a rehabilitation team consisting of consulting orthopedic and plastic surgeons, the industrial medical officer, a rehabilitation superintendent and an industrial physiotherapist, working from her own department within the factory. The activities of this team are centered around a rehabilitation workshop, known as the Retraining Shop, which was built and equipped for the purpose with a range of standard machines and bench assembly work selected from the factory and modified where necessary to provide remedial exercises and graded work prescribed by the visiting surgeons or the industrial medical officer. Continuity of treatment from the moment of injury up to return to full work is aimed at in every case, the rehabilitation team acting in group consultation at a weekly follow-through clinic held in the factory, followed by a round of the retraining shop itself. During this visit the response to treatment is assessed and the latter modified where necessary so as to fit in with a planned program of recovery. It is here that group consultation is of the greatest value because decisions can be taken in regard to the conduct of the case which may materially improve the prognosis. Moreover, the good will and cooperation of the patient are assured when he can take an intelligent interest in his treatment and can meet the surgeon on the workshop floor in the knowledge that his best interests are being served.

The retraining shop is in charge of a full-time rehabilitation superintendent, a trained engineer of senior status who is responsible to the company medical officer. He is the liaison officer between the hospital and the factory, and in preparation for this work he received a background of training in the basic principles of occupational therapy. He also undertakes the placement of incapacitated personnel elsewhere in the factory, which employs between 5 and 6% of registered disabled persons, and in this work, his status within the organization allows of easy access to departmental heads. A weekly clinic is held at the local hospital when plaster changes and other cases requiring investigation or a surgical opinion are transported to and from the hospital by coach at the company's expense. At this clinic, which is attended by the rehabilitation superintendent, potential cases for rehabilitation are selected in consultation with the surgeon, sometimes while still in the in-patient stage.

The scheme is comprehensive; non-industrial injuries as well as orthopedic and disabled ex-service patients amounting to 39% of the total are admitted to the retraining shop, or are dealt with at the follow-through clinic. Most of the clinical material is surgical, but above 20% of

patients eligible for admission are of a medical or psychological nature. The resources of the retraining shop, however, are only called upon when the patient cannot be accommodated at his own work, and since the scheme came into operation over 500 placements of a temporary or permanent nature have been made within the factory for reasons of health. Physiotherapy, given on an appointment basis during works time, is an important adjunct to treatment and this, in conjunction with the weekly follow-through clinic, effects an enormous saving of time which otherwise might be spent either by enforced absence from work or in an already overloaded hospital out-patients department. Cases are discharged back into the factory when they have reached a stage at which normal work, or some modification of it, ensures a steady return to full function. After severe injury or illness, trial placements on selected work inside the main factory precede the final placement in order to ensure that the demands of the job can be met to the satisfaction of both the patient and his supervision. A summary of some 906 cases admitted to the retraining shop since it commenced operations in 1946 is set out in Table 1.

TABLE 1.
SUMMARY OF CASES WHICH HAVE PASSED THROUGH THE RETRAINING SHOP FROM 1/4/46 TO 12/12/48

Works accident cases (occupational)	553	61%
Personal cases (non-occupational)	353	39%
Total cases	906	100%
Main Classification:		
Medical cases	124	13.7%
Surgical cases	751	82.8%
Psychological cases	31	3.5%
	906	100 %
Period of Stay:		
Medical cases	10.5	weeks
Surgical cases	5.3	weeks
Psychological cases	25	weeks
Total average stay	12.5	weeks
Cases attending part time	12	weeks
Disposal:		
Return to full work	809	89.3%
Return to modified or alternative work	97	10.7%
Died	4	
Surgical Cases:		
Fractures	215	
Soft tissue injuries	536	
	751	
Soft Tissue Injuries:		
Sepsis (acute and chronic)	175	
Lacerations	107	
Sprains and miscellaneous injuries	62	
Tenosynovitis	58	
I.D.K.'s	32	
Contusions	21	
Amputations	19	
Displaced I.V. discs	13	
Cut tendons	13	
Peripheral nerve injuries	9	
Hernias	8	
Dislocations	7	
Tennis elbows	6	
Burns	6	
	536	
Medical Cases:		
Rheumatic	37	
Digestive	17	
Circulatory	16	
Debility	15	
Dermatological (occupational)	14	
Dermatological (non-occupational)	6	
Respiratory (non specific)	8	
Tuberculosis	5	
Nervous	2	
Miscellaneous	4	
	124	

The men receive their basic rates of pay with 20% added in the case of bonus workers as a financial incentive, but in spite of the varying quality of the clinical material from day to day, the shop operates at about 65% efficiency as compared with the rest of the factory. All the work done is of a production nature and the output of the shop contributes a useful quota to the production demands of the factory. This in itself is a powerful incentive towards recovery, for not only does it provide a more realistic approach to treatment than the orthodox handicraft methods of the occupational therapist, but it also avoids the monotony of stereotyped exercises performed in a physiotherapy department. Moreover, it creates a sense of responsibility in the patient as a working member of a team and gives him some tangible evidence of his usefulness to society. An assistant rehabilitation officer, a skilled engineer, is in immediate charge of the men in the shop, and under his supervision use is made of skilled men who are undergoing rehabilitation, in the manufacture of the mechanical gadgets designed for therapeutic purposes. Suggestions are encouraged from the patients themselves with regard to the appliances in use, and this helps to sustain interest and the morale of the shop as a whole. Patients are recruited from all sections of the factory from foremen or junior executives down to shop laborers and office boys. The maintenance of morale and discipline among such patients demands a human understanding and the application of a practical psychology based on years of experience within industry, and in this respect the choice of the rehabilitation superintendent and his assistant is of the utmost importance.

The application of engineering methods to occupational therapy is one of the most interesting and fascinating developments which has emerged from the scheme, and examples of this work are found in the accompanying photographs. In addition to this, the design and manufacture of orthopedic appliances such as the Vauxhall Boot or the use of "Perspex" splints (methyl methacrylate polymer) in place of plaster, provide examples of how the engineer can assist the surgeon in improving standard methods of treatment.

The work is individually planned for each patient, periods of rest alternating with repetition exercise which is varied so as to avoid monotony and is discontinued with the onset of undue fatigue or pain. Initial rest is secured by splinting or by selecting the work, but prolonged immobilization, unless essential, is reduced to a minimum. Even so, use can be made of such function as remains so as to maintain muscle

Fig. 1.
Assisted Passive Flexion of the Fingers by means of a Sponge Rubber Padded Grip attached to the Operating Lever of a Drilling Machine

tone and a good circulation in order to minimize the resultant joint stiffness. When movement is commenced, an endeavor is made to translate this into some useful form of work assisted in its early stages by physiotherapy and reinforced by mechanical contrivances designed to reproduce a natural physiological movement. Repetition exercise of this nature is of great value in re-educating the patient back into the feeling of movement which marks an important stage in recovery. When this stage is reached, treatment is directed towards the development of coordinated muscle power and joint movement, and here close supervision is necessary in order to prevent "trick" movements for which special splinting may be necessary.

Fig. 2.
Special Grip designed for attachment to the Operating Lever of a Machine. The Squeeze Action of the Fingers induces Flexion of the Terminal Joint of the Thumb by means of a hinged attachment made of Transparent Plastic material

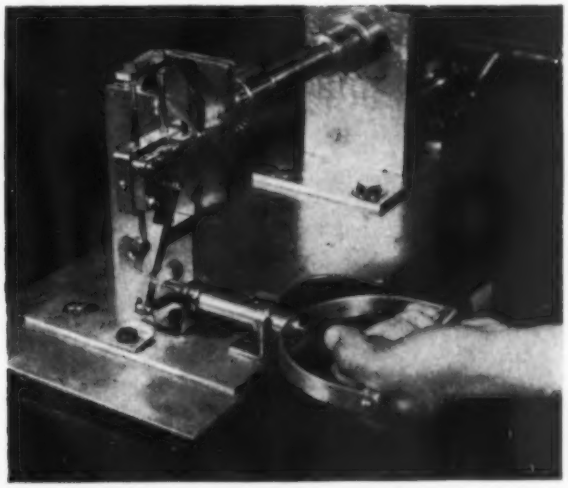

Fig. 3.
Hand Tapping Device which necessitates alternating Pronation and Supination Movement of the Forearm

It is during the initial stages of recovery that the services of the physiotherapist are of the greatest value, particularly in the case of recently healed wounds released from splinting where there is some vascular disturbance or a risk of contracture. At this stage, passive movements combined with hot wax therapy and massage are of more importance than the cruder forms of exercise therapy available in the retraining shop. Nevertheless, early evidence of improvement on the part of the patients acts as a powerful stimulus towards recovery and is the prelude to the next stage, when active movements involving groups of muscle while at work, play the dominant role in treatment.

Of all the machine tools in use, the single-spindle drilling machine is by far the most valuable for giving movements to the fingers, hands and arms. The machine may be worked either by pushing or pulling on the operating lever to which special grips may be attached (see Figs. 1, 2 and 3). A variety of bench work of which sub-assembly, hand reaming operations or the bending of copper and steel pipes over formers are typical examples, can provide clean dry work for people with unhealed wounds as well as give exercise to the fingers and hands. Mobilization of the knee and ankle joints, together with quadriceps development, either preceding or following cartilage removal, may be obtained through the medium of leg-operated bench vises worked against the resistence of a weight slung over a pulley (Fig. 4) or by modifications of the kick and pedal action presses used for the riveting of brake shoe linings. Such machines are capable of giving nine to 10 thousand knee movements a day. Hand milling machines, capstan lathes and fly presses, modified where necessary, are also useful for arm exercise (Fig. 5), while tapping, deburring and reaming operations can be performed on appliances such as the piercing die and other apparatus illustrated. The latter was

Fig. 4.
Quadriceps Development by means of a Leg-Operated Punch Vise worked against a Counter-weight Resistance slung over a Floor Pulley

designed and manufactured in the retraining shop itself for specific therapeutic purposes. Most of this work can be made sedentary with the exception of the bar-bending fixture shown which is used for maintaining tone in the erector spinae muscles in the case of back injuries (Fig. 6).

Fig. 5.
Drilling Machine adapted for use by either arm. Mobilization of the Shoulder Joint can be secured by means of alternating the position of an Adjustable Handle attached to the Operating Lever of the Machine

Fig. 6.
Bar Bending Fixture for Development of the Spinal Muscles following Recovery from a Back Injury

Considered in concrete terms of lost time, the results which follow such a regime compare favorably with standard methods of treatment. Almost 90% were able to return to their pre-disability jobs, the other 10% (mostly medical) requiring special placement. Four cases died while within the purview of the scheme after having to cease work altogether—two from inoperable cancer and two from cardiovascular disease. Figures for some of the more common injuries are set out in Table 2.

ACUTE SEPSIS: In the medium engineering industry the majority of lost time accidents are due to comparatively minor injuries of which sepsis forms an important group. In this factory the most frequent industrial injury is the lacerated or abraded finger, and nearly 60% of all accidents involve the hands. The prevention and prompt treatment of sepsis is of the first importance, and cases which are at all serious or are not responding to treatment are referred to the hand unit at the local hospital. Here they receive intensive penicillin therapy and surgical drainage, followed by local dressings with streptomycin cream. Serious hand infections such as those affecting the mid palmar and thenar spaces are enclosed in plaster as soon as the acute stage has subsided although the wound is not yet healed, and the fingers are encouraged to function by providing selected dry work at the sub-assembly bench.

Often such patients can return from hospital to the retraining shop the same day and this routine has prevented the permanent disability that frequently followed such infections in the past. The results with streptomycin cream have been very encouraging; secondary infection has been reduced to a minimum with freedom from pain and a shorter healing time. During the two years preceding the introduction of the rehabilitation scheme, the average lost time for a septic

TABLE 2.

	Vauxhall Patients 1946-48 (2½ years) Accident and Non-works Accident Cases			Vauxhall Patients 1944-46 (Works Accidents Only)	Other Patients 1946-48 (Luton & Dunstable Hospital Fracture Clinic)				
	No. of Cases	% Losing No Time	Average Days Off Work	Average Days Off Work	No. of Cases	% Losing No Time 1945-48	Average Days Off Work	Days Lost F.C.R. (1)	Days Lost F.C.R. (2)
Fractured Hallux	33	48.5	3.7	32	16	10	24.5	—	—
Potts Fracture	50	12	15.2	51	132	2	32.9	329	77
Scaphoid Fracture	43	66	6.5	57	55	30	14.7	322	77
Colles Fracture	21	77.5	2.7*	39	59	10	22.4	203	49
I.D.K. operations	17	0	18.4	—	20	0	31.5	—	—
Acute Sepsis (surgically treated)	149	47.6***	5.5**	22.5	—	—	—	—	—
				26.5	—	—	—	—	—
Tenosynovitis extensors of wrists	191	94.8****	1.28	(% losing no time 44.4%)					

* Reduced to 1.5 days in 1948.
** Reduced to 2.2 days in 1948.
*** Increased to 68% in 1948.
**** Increased to 100% in 1948.

F.C.R. (1) Fracture Commission Report 1935 on cases not treated in organized Fracture Clinics —days lost.
F.C.R. (2) Fracture Commission Report 1935 on cases treated in Fracture Clinics of Liverpool and Manchester —days lost.

finger was 22.5 days, and for amputated fingers the figure was 54 days. During 1947 this figure fell to 11.6 days, and in 1948 a new low level of 2.2 days was reached. Furthermore, during 1947, only 5.4% of cases lost no time, but in 1948 this figure rose to 68% (see Table 2).

FRACTURES: Reduction in lost time and a low incidence of delayed union or non-union or of other complications were characteristic of the whole series. The advantage of allowing as near normal use as possible to the limb becomes apparent when comparison is made between the same type of case which remains away from work and attends the physiotherapy department as a hospital outpatient. The rate of union of the fracture is accelerated, post-fixation physiotherapy is seldom required, recovery of function after removal from a splint is much more rapid, and permanent disabilities due to the fixation itself are seldom seen. The figures from the Fracture Commission Report, 1935, are merely quoted as an indication of improved methods of treatment which now apply to the country generally and a more accurate assessment of the value of industrial rehabilitation methods is only to be found by comparing the figures for Vauxhall patients for the two years preceding the introduction of the rehabilitation scheme in 1946.

TENOSYNOVITIS: A good deal of needless incapacity can result from tenosynovitis if it is not recognized and treated in the early stages. For the two years prior to 1946, 44% of all cases ceased work for an average period per man of 25.5 days, the average loss for the whole series being 13 days. During 1946, 1947 and 1948 these figures fell progressively to 9.4, 2.9 and 0%, with an average loss of 2.5, 1 and 0 days respectively. The use of "perspex" splints with or without short wave therapy (which can be given because the splint is easily removed) will frequently allow the patient to continue his normal work (Fig. 7).

MEDICAL CASES: These were less spectacular and fewer in number, selected cases responding on the whole satisfactorily to a period of reconditioning in the retraining shop. Not infrequently they were admitted pending a change of occupation, but for the chronic case, suitable placement rather than rehabilitation is to be preferred. The cases fell under the following headings:

RHEUMATIC GROUP: These included resistant fibrositis, rheumatoid and osteoarthritis and gout. Reliance was not placed wholly on physiotherapy. Etiological, constitutional and occupational factors, as well as the patient's attitude of mind are all of importance. The treatment was directed towards the restoration of muscle tone and of movement in the affected joints by means

Fig. 7.
An Example of Transparent Plastic Splinting for use in Cases of Tenosynovitis of the Radial Extensors of the Wrist and Thumb

of graded work alternating with periods of rest.

DIGESTIVE GROUP: No satisfactory solution to the problem of chronic dyspepsia has been found. Postoperative cases did well and all gained weight. Peptic ulcer cases remained quiescent in symptoms when freed from the pressure of a production area and the necessity for night work. Light midday meals in the canteen no doubt assisted. The problem is a major one in industry generally and is intimately bound up with psychosomatic factors which are not capable of permanent solution by admission to an industrial rehabilitation center.

CARDIOVASCULAR DISEASE: These patients were given graded work until a satisfactory assessment of their physical capacity could be arrived at as a guide to suitable placement. In the case of manual workers, such a service is of great value after prolonged absence as may occur in coronary disease.

GENERAL AND POSTOPERATIVE DEBILITY: All these cases did well and gained in weight. The program consisted of a hardening-up period on selected work in preparation for their return to the factory. Hernia cases were enabled to return to work on the 14th day after operation and no complications were observed.

DERMATOLOGICAL GROUP: Both occupational and non-occupational cases were given clean dry work in a controlled environment where continuous observation and suitable treatment could be assured. This was of particular value in the early acute stages of industrial dermatitis occurring in susceptible individuals before the condition had become a source of serious worry to the patient or had developed into a neuro-dermatosis. On discharge, efficient prophylaxis or some occupational change was usually necessary.

NEUROSIS GROUP: Cases presenting symptoms of a deep-seated neuro-psychosis were not admitted to the retraining shop but were sent for observation and treatment to the Roffey Park Rehabilitation Center, at Horsham, Sussex. On the other hand, the milder type of case responded well to a period of relief from the speed and monotony of a production line. Those most benefited were mild anxiety states, returning ex-service men with resettlement difficulties, maladjusted individuals, and cases of simple or chronic industrial fatigue. The latter condition is sometimes encountered in older employees who feel unable to compete with younger men where a group bonus system of payment is in operation. The retention of such patients in a rehabilitation center beyond the period necessary for recovery or suitable placement is, however, undesirable.

TUBERCULOSIS: By arrangement with the Tuberculosis Officer, or the private practitioner, these cases if free from infection were enabled to return to work at a much earlier stage than formerly. Part-time work or rest periods after a meal break ensured the avoidance of fatigue and arrangements were made for such patients as required it, to be released for artificial pneumo-thorax refills. On return to the factory, the working environment was explored and if necessary the occupation was changed, although this was not always insisted upon when it resulted in a wage reduction.

SUMMARY: An industrial accident and rehabilitation scheme has been described and a brief analysis of the type of case dealt with over a period of two years and eight months is given. There seems little doubt that such a service has valuable contributions to make towards the advancement of social medicine, and in this work industry itself can provide the facilities. Emphasis is placed on the importance of the minor injury as a cause of much needless disability in industry, while economic and psychological factors in recovery should receive adequate consideration. It is necessary, however, to modify present conceptions of the place of the hospital in treatment and to enlist the interest not only of the general practitioner, but of the consultant, teacher and the medical student as well in the possibilities of modern industrial rehabilitation methods.

In practice, however, a scheme such as the one described is only feasible in a large plant possessing the necessary variety of work, suitable staff and sufficient financial backing to render it a practical proposition. In so far as Great Britain is concerned, it is of importance to point out that two-thirds of the working population are employed in factories of less than 500 persons and that 97% of 250,000 factories employ less than 250 people. The needs of these small units could be met by the establishment of group industrial rehabilitation centers based on the local hospital and supported by both local industry and government agencies. Such a center is already in existence in Great Britain and more are contemplated. Pioneer work in the field of practical rehabilitation has shown that it is only by the pooling of resources that the problem of the disabled can be tackled in a progressive manner, that it is a social problem as well as a medical one, and that if it is to be satisfactorily solved there must be a cooperative effort between patient, doctor, employer and government agencies within the framework of industry itself.

Analysis of Fifty Cases of Back Pain

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PRELIMINARY to undertaking a long-range study of patients with back pain, 50 such cases out of several hundred were selected for analysis. These covered a period of two and one half years and were chosen as the most severe allegedly due to injury. They have been analyzed in an effort to determine whether any significant trends are apparent. The 50 cases have been studied from the standpoint of diagnosis, causation, x-ray results, lost time, and duration of symptoms, and have been analyzed with respect to age. Observations also have been made as to psychosomatic factors, and, where used, the results of local procaine infiltration have been recorded. Of these 50 cases five, or 10% of the group, were referred for orthopedic consultations.

TABLE 1.
DIAGNOSIS

	No.	Percent
Lumbosacral strain	18	36%
Iliolumbar strain	14	28%
Muscle strain	6	12%
Strain unspecified	4	8%
Contusion	4	8%
Tension backache	3	6%
Sacro-iliac strain	1	2%

In Table 1 will be found the diagnoses on these 50 cases. Lumbosacral, iliolumbar, and muscle strains were by far the most common diagnoses made. The reason for this can be seen

TABLE 2.
ALLEGED CAUSATION

	No.	Percent
Lifting	33	66%
Falling	5	10%
Pushing	4	8%
Bending forward	4	8%
Slipping	2	4%
Pulling	1	2%
Twisting	1	2%

in Table 2, where the most common causation of back complaint was lifting. Sixty-six per cent of the cases studied claimed to have injured their back by lifting. Falls were the next most common cause, with occasional complaints of injuries caused by pushing heavy objects and from bending forward.

In this series one particular type of injury which warrants special comment involves middle-aged women who fell in the shop. Such a fall may be caused by a defective chair, or a chair which is tipped over backward, or by slipping on the floor. This series includes four instances of women who fell through some such cause and subsequently complained of back pain. All four of these women lost time from work and two were absent for periods in excess of two months. In all cases the symptoms appeared to be out of proportion to the extent of the injury and were extremely variable from day to day. All four women were emotionally disturbed when examined immediately after the injury; and all four subsequently developed symptoms in locations other than those directly injured by the accident.

TABLE 3.
X-RAY RESULTS

No x-rays were taken on 12 or 24%
X-rays were taken on 38 or 76%
Of these 38:
13 or 34% were normal.
25 or 66% had one or more abnormalities.

Abnormalities:	No.	Percent
*Osteoarthritis	11	28%
Spina bifida	10	26%
Asymmetrical L-S joint	4	10%
Spondylolisthesis	3	8%
Narrowed L-S joint	3	8%
Hyperlordosis	2	5%
Interlumbar type L-S joint	1	3%

*Of the 11 cases with osteoarthritic changes only 4, or 10% of all x-rayed, were under 50 years of age.

Of the 50 cases 38, or 76%, were subjected to x-ray examinations. Thirteen, or 34% of these 38, were normal and the remaining 25, or 66%, showed one or more abnormalities on the x-ray. The most common abnormality found was osteoarthritis. Of the 11 cases with osteoarthritic changes, seven were 50 years of age or older. No patient over 50 years of age in this series, who was x-rayed, failed to show osteoarthritic changes.

In another series of 50 asymptomatic preplacement x-ray examinations of the back in people over 50 years of age, 96% of them showed osteoarthritic change.[1] Hence the incidence of 100% of osteoarthritis in the age groups over 50 in this series is not at all unexpected. By contrast, of the 28 cases under the age of 50 x-rayed only four, or 14%, revealed osteoarthritic changes.

The incidence of spina bifida occulta in 26% of the cases x-rayed is identical to the incidence found in a series of 1446 x-ray examinations of the lower back reported previously.[2] This same comparison is true with the variations from the normal lumbosacral articulations and in the narrowing of the lumbosacral joint.

The only x-ray diagnosis that exceeds the incidence in the previously mentioned asymptoma-

1. Unpublished data.
2. BARTON, P. N.: The Significance of Anatomical Defects of Lower Spine. INDUSTRIAL MEDICINE, 17:2, 37-40, February, 1948.

tic series was that of spondylolisthesis. In this current series there was an incidence of 8% in contrast to the 2% found in the asymptomatic series.

It is interesting to note that no diagnoses of intervertebral disc pathology or of spinal fractures were made in this series of 50 cases.

TABLE 4.
LOST TIME

Total 11 cases or 22%	
Under 1 week	3
1-2 weeks	3
2 months	3
Over 2 months	2

As indicated in Table 4, 11, or 22%, of this series of 50 cases lost time from work. Of these only five were out for periods exceeding two months. As a contributory element in lost-time cases, psychosomatic factors of significance were present in five instances. These five constituted one-third of the 15 patients in whom psychosomatic factors appeared to be of some consequence.

TABLE 5.
DURATION OF SYMPTOMS

	No.	Percent
Under 1 week	15	30%
1-2 weeks	12	24%
1 month	7	14%
2 months	6	12%
3 months or over	10	20%

The analysis of the duration of symptoms as seen in Table 5 in the 50 cases reveals that 54% were completely relieved of their symptoms at the end of two weeks. It is quite clear, however, that of those whose symptoms continued beyond two weeks, nearly half extended beyond a three-month period. It has been our impression that the most important single factor in the prolongation of symptoms of back pain has been psychogenic. All three cases with a diagnosis of tension backache claimed to have symptoms still present one year after onset.

TABLE 6.
ANALYSIS OF AGE FACTOR

Age Group	20-29	30-39	40-49	50-59	60-69
No. Cases—Total 50	15	14	11	6	4
Duration of Symptoms					
Under 1 week	7	3	2	1	2
1—2 weeks	5	2	2	2	1
1 month	1	3	1	1	1
2 months	2	2	1	1	0
3 months or over	0	4	5	1	0
No. Lost Time					
Total 11	0	1	5	4	1
Percent of Age Group					
Losing Time	0	7%	45%	66%	25%

In Table 6 the age factor is compared with the duration of symptoms and the lost-time cases. The incidence of back injury in relationship to age has very closely followed the age distribution of the plant population. During the period of this study the mean age of the plant population was between 39 and 40 years. With the exception of elderly employees, the severity of back complaints increased directly with the age of the employee, if we consider time lost from work a true criterion of severity. This is further confirmed by the identical pattern exhibited in the analysis of symptom duration.

It will be seen that under the age of 30 there were no cases which had symptoms over two months. There were no lost-time cases. Yet 30% of all the cases fell in the decade 20 to 30 years of age. In the next decade, 30 to 40, there was approximately the same number of cases as in the preceding decade. One of these cases lost time from work. Four, or nearly one-third of this group, had symptoms at the end of three months. In the next decade, 40 to 50, nearly one-half of the cases had symptoms persisting over three months and an equal number of cases lost time from work. Although the duration of symptoms was considerably less in the decade 50 to 60, there was a very high (66%) incidence of lost time cases. In the following decade, the trend toward a briefer period of symptoms persisted, with no case having symptoms longer than one month. A possible explanation of this change in trend from 50 through 70 years of age may be that, in general, this group of 10 cases did not perform as arduous work as the younger employees.

THE treatment of these 50 cases followed generally conservative methods with the judicious use of support, physiotherapy in the form of massage, diathermy and infra-red. Analgesic medications were also utilized, principally in the earlier phases of the treatment. Probably most important, however, was the use of graded exercise through carefully selected work wherever possible. Kottke has observed that immobilization of an acute muscle strain allows development of fibrosis and prolongs the condition.[3] Our experience has been that the patients for whom properly selected, regular, full-time work could be provided made a more prompt and more complete recovery than those, not necessarily more severe, who were forced to lose time from work. Particularly disappointing has been our experience with a few patients having back injuries with concomitant advanced osteoarthritis whom our orthopedic consultants have treated with immobilization.

Some special comment may be made regarding the use of local procaine infiltration in the treatment of back pain. Twenty per cent of the series of 50 cases were deemed suitable for procaine injections. The indications used for this treatment were the history of acute onset of pain and the finding of localized tenderness and of muscle spasm. Six of the 10 cases so treated obtained relief to such an extent that they were able to return directly and resume their usual

3. KOTTKE, F. J.: Physical Treatment of Backache. *J.A.M.A.*, 139:1055-1057 (April 16) 1949.

work without any other form of treatment. The other four cases obtained temporary relief but subsequently required other forms of treatment.

Psychosomatic factors were considered important in about 30% of this series of cases, and, as previously indicated, this included about half of all the lost-time cases. This figure of 30% can not be considered unusual since it is quite consistent with the findings reported in several large series of medical patients.[4] It is evident, however, that this group of patients requires more attention than those cases in which psychosomatic factors did not appear important. It is equally apparent that they are the most difficult to manage medically. This group includes a number of the patients where the location of pain appeared to change from day to day. In many instances outside factors were found to be definitely contributory. Not infrequently histories were obtained of disturbed home conditions and of work situations which were unsatisfactory to the patient. However, it was felt that these same psychosomatic factors often were the cause, rather than the result, of the disturbed home or work situations.

This series of 50 cases included all the lost-time cases of back injury experienced in a plant with an average working population of more than 5,000 over a two and one-half year period.

That there have been only 11 lost-time cases during this period is due, in my opinion, largely to the fact that we have made every effort to enable these individuals to continue at work on a selected basis. Our experience has shown that patients who have been usefully and gainfully employed during the period of their symptoms have been relieved of their complaint more rapidly than those who were necessarily absent from work. Except for a few instances, the use of complete rest, as frequently advocated for all cases of back injury, has not seemed indicated or useful.

FROM this study, limited as it may be, we believe it will prove useful to consider the following factors in managing occupationally connected back cases:

1. Middle-aged women, who experience falls of one type or another in the course of their work, can be considered major problems at the onset.
2. With the exception of spondylolisthesis, the x-ray findings in this series of cases with back pain allegedly due to injury are not different from what has been reported in a large series of asymptomatic cases.
3. All cases in which symptoms persist longer than two weeks demand special evaluation and study since it can be anticipated that more than half of this particular group will have prolonged symptoms.
4. Any patient between 40 and 60 years of age afflicted with back pain can be considered a major medical problem when first seen.
5. The use of work therapy, and by this we mean carefully selected, graded work, does not seem to prolong symptoms but actually appears to shorten the duration of back complaints.
6. Carefully selected patients respond favorably to the use of local procaine infiltration of localized tender areas.
7. Since the presence of psychosomatic factors is important in the duration of symptoms, all cases with back pain should be carefully studied from this standpoint.

4. WAGGONER, R. W.: Psychoneurosis, Its Significance in General Practice. *J.A.M.A.*, 134:779-781, (June 28) 1947.

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A New Coolant: Its Dermatitis Producing Qualities

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DERMATITIS occurring in workers using a new coolant is herein reported. The industry involved is one engaged in the manufacture of ball bearings. This requires many machining operations, and consequently involves a high degree of coolant exposure.

The necessity of reducing the temperature and providing lubrication at the point of contact of tool and product in machining has long been recognized by the industrial engineer. Throughout the years, many new cutting oils or coolants have been introduced—primarily for the purpose of reducing production costs by prolongation of tool life, product improvement, and other mechanical considerations. Attention to the dermatitis producing qualities of a new cutting oil usually has occurred secondarily, even though cutting oils are reported to be the most frequent cause of dermatitis in the machining industry, and dermatitis in general is stated to be the most prevalent occupational disease.[1,2,3,4]

During the summer of 1948, an employee reported to the Medical Department of New Departure's Bristol Plant with a dry fissuring, chronic eczematoid rash on the dorsum of his fingers, stating "I've been working with Lysol® for the past two months." On investigation it was discovered that the employee was one of 13 who had been working with a new coolant, unfamiliar to us, with the proprietary name of Lusol®, and not with the disinfectant, Lysol®.

Lusol® belongs to the water soluble group of cutting oils, although it differs basically from the usual example in that it contains no petroleum products and no animal or vegetable oils or fats. The manufacturer states that the coolant contains eight ingredients which may not exist as such in the finished product since chemical reactions may occur during compounding. The coolant as used contains the following components in concentrations of 0.1% or less: triethanolamine, sodium nitrite, carbitol®, minute amounts of triton N-100®, sulfonates, and approximately 96% water. Two of the ingredients are not known.

Triethanolamine has the properties of a soap and is used in cosmetics. J. G. Downing[5] has incorporated it in an industrial protective cream, and has concluded that the cream contains no irritants or sensitizers. A. G. Cranch *et al*[6] conclude that carbitol®, the monoethyl ether of diethylene glycol, which is a widely used solvent in cosmetics and medicaments, has only slight sensitizing properties. W. M. Meininger[7] reaches the same conclusion from the results of his recent study. Sodium nitrite has been used extensively as a preservative for meat, and has not been reported to possess unusual sensitizing properties. As a group, surface-active agents, of which the sulfonates are a major segment, are rare sensitizers.[8] Triton-N-100®, an alkylated aryl polyether alcohol, likewise falls into this category and is not thought to be a sensitizer. Thus none of the known components would appear to be primary irritants or sensitizers.

From the Institute of Occupational Medicine & Hygiene, Yale University School of Medicine, New Haven, Connecticut, and the New Departure Division of General Motors Corporation, Bristol, Connecticut. Assistance was given by DR. P. N. BARTON, New Departure Plant Physician at Bristol, DR. A. S. GRAY, Connecticut State Department of Health, DRS. E. M. COHART, and J. W. MEIGS, Yale University, Department of Public Health, and DR. A. V. NASATIR, Los Angeles City Department of Health.

Summary of Findings

A. INCIDENCE: Following the introduction of the new coolant in April, 1948, there was a gradual increase in the number of persons exposed, as more machines were changed over from insoluble cutting oil. (See Table 1.) In February, 1949, an average of 129 persons were exposed daily, the maximum number during any month. Subsequently no new individuals were exposed.

A total of 15 cases of dermatitis attributable to the new coolant occurred between August, 1948, and March, 1949. Cases of dermatitis from insoluble cutting oil for the preceding year are also tabulated (Table 1.) as a control, to deter-

TABLE 1.
COMPARATIVE INCIDENCE

	LUSOL®	
1948-1949	No. Exposed	No. New Cases
April	10	0
May	10	0
June	11	0
July	11	0
August	13	1
September	25	1
October	31	2
November	77	2
December	94	3
January	116	2
February	129	4
March	100	0
Total	627*	15
Incidence 2.4%		

	INSOLUBLE CUTTING OIL	
1947-1948	Est. No. Exposed	No. New Cases
April	450	0
May	450	3
June	450	4
July	450	0
August	450	3
September	450	2
October	450	1
November	450	3
December	450	1
January	450	1
February	450	1
March	450	0
Total	5400*	19
Incidence 0.33%		

*Represents man-month exposure.

mine their comparative incidence and severity. Conditions were comparable in both series to the extent that the same department and machines were involved, with the one known variable being the change in cutting oils.

B. DESCRIPTION OF DERMATITIS: Eight of the 15 cases had hyperemic papulo-vesicular eruptions, all in areas corresponding to those of maximum exposure, with the dorsum of fingers and hands, and anterior forearms most often involved. Five cases presented intense hyperemia with pruritis of the anterior forearms with a few scattered papules, and a rare pustule. Two cases exhibited hyperemia of the dorsum of the fingers, with associated cracking and fissuring. One of these developed into what was thought to be a dermatophytid reaction which persisted for three months after removal from the contact. (See I.)

C. EXPOSURE BEFORE ONSET: This ranged from three days to 26 weeks with an average of 8.5 weeks.

D. DURATION OF DERMATITIS BEFORE REPORTING: This varied from one day to six weeks with an average of 1.7 weeks.

E. SEX: Fourteen cases occurred in men; one case in a woman. The ratio of exposed men to women was approximately 25 to 1.

F. DERMATOLOGIC HISTORY IN THE 15 EMPLOYEES WITH DERMATITIS:

(a) Epidermophytosis. Three persons gave a history of having had dermatophytosis of the feet, two of which appeared active at this time. (See I.) Two had histories of insoluble cutting oil folliculitis, one of whom also gave the history of dermatophytosis without recent activity.

(b) Allergy. Three patients gave a positive history; one of recurrent urticaria (the same employee with the dermatophytid reaction), one of seasonal pollenosis, and one of asthma, urticaria, and seasonal pollenosis.

G. PERSONAL HYGIENE IN THE 15 CASES: In general, this was considered average for shop personnel, with only two employees showing evidence of being unaware of its importance.

H. TYPE OF SKIN IN THE 15 CASES: There was an equal distribution of individuals with fair and dark complexions. An evaluation of the amount of hair on the arms was made at the time of initial examination and eight persons had less hair than would generally be expected for their ages. In general, those with fair complexions had less hair.

I. ASSOCIATED DERMATOPHYTOSIS: Two employees had an active dermatophytosis at the onset of the occupational dermatitis, one of whom it was felt, exhibited a dermatophytid reaction accounting for the persistence of symptoms three months after removal from occupational exposure.

J. PATCH TESTS (See Table 2.): On eight of the 15 employees who developed dermatitis, diagnostic patch tests were performed. Positive reactions, varying from erythema to minimal vesiculation, occurred in five of these eight; the remaining three were negative. Three of the five reactors had positive tests with both freshly diluted coolant and with coolant taken directly from the machine in which the particular employee had been working. In addition, one reacted positively to the unused material and negatively to the used: while the fifth reacted only to the used and not to the unused.

TABLE 2.
DIAGNOSTIC PATCH TESTS

Persons Tested	Freshly Diluted Coolant	Used Coolant	Triethanolamine	Carbitol®	Sodium Nitrite	Total Persons Reacting
1. P.S.	+	+				1
2. R.C.	–	–				0
3. J.M.	–	+				1
4. H.F.	+	+	–	–	–	1
5. J.C.	–	–				0
6. N.C.	+	–	–	–	–	1
7. M.M.	–	–				0
8. R.Q.	+	+				1
Total Positive Tests	4	4	0	0	0	5
Total Negative Tests	4	4	2	2	2	

Single patch tests with known ingredients (triethanolamine, carbitol®, and sodium nitrite) on two of the five reactors to the original coolant were negative.

K. SEVERITY IN THE 15 CASES: The following items indicate in a general way case severity:

(a) *Medical Transfers.* Six persons were transferred because of their dermatitis. Two of these were returned to the exposure, each on two occasions, with recurrences after each return. One of the six subsequently returned to the exposure and did not experience a recurrence. In the remaining three persons, work trials were not attempted.

(b) *Hardening.* In four persons, the dermatitis cleared while they remained exposed, thus demonstrating what is considered to be true hardening. In five individuals, hardening could not be determined as they were transferred for non-medical reasons to insoluble cutting oil exposure, following which all experienced a rapid subsidence of their dermatitis.

(c) *Visits per Case.* These varied from three to 44 with an average of 14.7. The average time lost in production for each visit to the plant hospital for treatment was 22 minutes.

(d) *Duration of Dermatitis.* This ranged from one to 10 weeks with an average of 5.5 weeks. See Table 3 for a comparison of the severity with the control series.

(e) *Lost Time or Compensation Cases.* None.

Discussion

A. ETIOLOGY: From the facts presented, there is evidence that the cases of dermatitis under discussion were related in some way to the introduction of a new coolant. Thus, not one of the individuals had ever had a similar type of dermatitis; and in all of them the conditions developed while exposed. The eruptions began

and were most severe on parts of the body corresponding to areas of maximum exposure. Appearance was that of a typical contact dermatitis of chemical origin; and positive patch tests added corroborative evidence. In those persons transferred for any reason, the dermatitis rapidly cleared, and recurrences occurred in two of three individuals who were later returned to the coolant exposure. The diagnostic criteria for occupational dermatitis would seem to be well filled. In addition, requirements for compensability are likewise met in this series of cases.[9]

Insufficient time and experience have elapsed to conclude that the dermatitis is the result of an allergic sensitivity. However, such may well be the case since 14 of the persons involved were exposed more than one week before onset of the dermatitis, the average being 8.5 weeks. According to Schwartz[10] dermatitis occurring less than one week after initial exposure probably is not allergic in nature. The one case occurring after only three days' exposure was that of a female employee. This may have been due to primary irritant properties of the material to which she was exposed, particularly since the skin of women is considered more sensitive to external irritants than that of men.[11] No history could be obtained whether or not she may have worked longer periods than usual in the exposure; or whether the coolant might have become concentrated by evaporation, and thus have assumed primary irritant properties.

The percentage of positive patch tests likewise favors an allergic etiology, particularly since there was a comparable number of positive results from both the freshly diluted coolant and the coolant taken directly from the machines. Tests were performed and interpreted according to the technique of Schwartz.[12] The fact that both the used and unused materials produced positive results also minimizes the probability that the offending substance could have been produced during the use of the material.

Only in one case in which the patch tests had been positive were repeat tests made, both of which showed stronger reactions. We recognize the dangers involved in reaching conclusions on such a limited number of patch tests; yet we do feel that the percentage of positive results (60%) obtained among those tested indicates a significant trend. It should be stressed that patch testing in our series was performed solely as a diagnostic procedure. To our knowledge a series of prophetic patch tests using this material has never been done, although information from such a study might well have been of value to us before the new material was introduced.

Folliculitis was not seen among those persons exposed to the new coolant. This is as would be expected since the material is said to contain no petroleum products or any animal or vegetable oils or fats, the agents responsible for most of the folliculitis of occupational origin. In fact, on several personal inspections of the working areas, a few men who had recently been transferred from insoluble cutting oil to the new contact remarked that they had had pustules on the forearms off and on for years and that soon after changing over to the new coolant, their skins became clear.

B. POSSIBLE ASSOCIATED FACTORS: Because of the small number of cases, the influence of sex cannot be determined.

On an average, over 1½ weeks elapsed from the onset of the dermatitis to the time the worker reported to the hospital. The plant hospital has always advocated the desirability of early case reporting. However, the average duration of the dermatitis after reporting is no greater in those who reported later than 1½ weeks than in those who reported earlier.

The type of skin apparently was not a factor of any consequence in our cases. No trends were observed either in the occurrence or severity of the dermatitis in employees with light or dark complexions, with or without an excess of hair. Personal hygiene also appears irrelevant.

Similarly, and as a result of the small number of cases, no conclusions could be reached as to the importance of previous allergies or dermatitis, although three of our 15 patients gave positive histories.

The presence of dermatophytosis, while unquestionably important in one case, could not be incriminated further. However, it behooves one to be aware of the possible role the fungus infections can play in occupational dermatitis.

In searching for an explanation of the dermatitis, many questions have arisen which we are unable to answer. As suggested by Ernst and Merchant[13] we, too, would like to know whether or not a chemical reaction may take place between the cutting fluid and the freshly ruptured chip surface, and thereby produce a sensitizing substance.

The presence of surface-active agents in the coolant poses interesting questions with respect to the probability that they may affect the penetration of materials through the skin. In fact, this property of enhancing skin penetration is now widely accepted and is applied extensively in the compounding of many medicaments. The contaminants, such as the lubricating and hydraulic oils, once thought unimportant because of their low concentration, may assume greater significance. Woodward and Calvery[8] found that when a preparation with good penetrating characteristics is used on the skin, there is a concomitant increase in primary irritation. The question still unanswered is whether or not this increased skin penetration is more likely to favor a higher incidence of sensitization.

C. INCIDENCE: The unusually high incidence of dermatitis with the new coolant may well be explained by the fact that during the first few months following the introduction of a new substance with sensitizing potentialities into a group without previous exposure, the morbidity may

be higher than expected, owing to an absence of immunity in the group. Gradually thereafter the morbidity rate would tend to decrease and reach a level as the effects of hardening would become apparent. This has been seen here frequently with other sensitizers following periods of absence from vacations or lay-offs at which time the incidence of dermatitis from those sensitizers may rise temporarily, owing to a loss of immunity or hardening.

As indicated by a statistical analysis of the standard errors, which reveals a significance ratio of 6.5, well exceeding the usually accepted critical value of 2.5, the incidence of dermatitis from the new coolant is significantly higher than that from the insoluble oil over the preceding year and it is higher than could be reasonably attributed to chance.

D. SEVERITY: Reference to Table 3 reveals some interesting facts. Whereas the visits per case were almost three times as many for the new coolant as they were for the old, the average duration of dermatitis was almost twice as long for the latter. We feel that these seemingly paradoxical findings can be explained on the basis that the dermatoses involved are entirely dissimilar. As indicated, the new coolant produces an allergic sensitivity reaction, while the insoluble cutting oil produces a hyperkeratitic response which leads to a folliculitis. The former generally is more severe in its manifestations; and, with the exception of those persons in whom hardening may occur, the only recourse must be to remove the affected individuals permanently from the contact. Under adequate medical control, with strong emphasis placed on personal skin care, we have found it rarely necessary to transfer a person working in insoluble cutting oil. With a visit now and then to the hospital for a check-up, many of these employees have had chronically active folliculitis for years with only a few pustules on the forearms at any one time. In contradistinction to this, the allergic rash often requires intensive daily care in the acute stages. Fortunately we were able to find suitable work for those who had to be transferred, and no lost time resulted.

E. MANAGEMENT: Every attempt was made to keep those involved on the job in the hope that they would harden to the contact, and, as a result, four of our 15 cases cleared while exposed. That hardening may occur in allergic dermatitis is now generally accepted.[14]

Treatment followed simple lines. Boric acid soaks and wet dressings were used when vesiculation and marked acute inflammation were present. For the subacute stages, which required the longest treatment, bland ointments, such as plain lanolin or a mixture of boric acid ointment and lanolin (20:1) were used. For the dry, eczematoid cases, and only three progressed to this stage, zinc oxide ointment in addition to the bland ointment above was used.

F. ENVIRONMENTAL STUDIES AND PREVENTION: In an effort to prevent further cases, and still not having sufficient evidence to advise discarding the material, we investigated personally the operations involved. On one group of operations where the new coolant was used exclusively at that time, we found that, prior to machining, the parts had been washed in sodium metasilicate, an alkaline cleaner. Referring to Table 4 and noting the minimal rise in alkalinity (from 8.5 to 8.78) of a sample taken from a machine which had not been cleaned for two or three months over one from a machine recently cleaned, in operation a few minutes, it does not seem likely that the alkaline cleaner contaminated the coolant sufficiently to cause the dermatitis. On the remaining operations to which the new cutting oil was applied during the following months, the sodium metasilicate was not used, and the occurrence of dermatitis continued without change. Thus this factor in the etiology seems to have been eliminated.

Contamination of the coolant with the hydraulic and lubricating oils used in the machines was suspected, for, on gross inspection of the coolant in the wells of the machines, a viscous oily film could be seen floating on the surface. Reference to Table 4 shows the degree of contamination with the oil, and the increase which occurs after long and continued operation of a machine. A portion of this contamination, in some machines which had recently been changed over from insoluble cutting oil, may have been due to inadequate preparation, with the result that some of the oil remained in the machines. Whereas we never reached a conclusion as to what effect this mixing with oil might have had, we felt that it probably was not significant since none of our cases exhibited the folliculitis which one would expect from oils of this kind. Likewise, the comparable number of positive patch tests which we obtained from both freshly diluted coolant and used coolant supports that view.

Desiring to study the possibility that sulfur or chlorine from the contaminating oils could

TABLE 3.
COMPARATIVE SEVERITY

	LUSOL®	INSOLUBLE OIL
Visits per case	3 to 44 with average of 14.7	2 to 30 with average of 9.9
Duration in weeks	1 to 10 with average of 5.5	5 to 50 with average of 17.3
Transfers	6	0
Lost Time	0	0

TABLE 4.
ALTERATIONS IN THE COOLANT WITH USE

	pH	Sulfur %	Chlorine %	Oil %
Sample, freshly diluted	8.5	0.002	0.001	0
Sample from machine recently cleaned, in operation few minutes.	8.65	0.012	0.003	1.7
Sample, from machine not cleaned for 2-3 months	8.78	0.024	0.005	3.05

have played a role, we made determinations on samples as listed in Table 4. From the small concentrations present and the minimal variations seen after use, it would appear that these substances probably played little or no role in the dermatitis.

Carrying on with our investigations in the hope of preventing more cases, we evaluated the actual method of preparation and usage of the material. The concentrated coolant was prepared for use by diluting it 50 to 1 with water and storing it in 800-gallon tanks. All the machines had self-contained recirculating systems, which necessitated occasional replacement of coolant lost by evaporation, spillage, or adherence to the machined product. In the majority of the machines personally inspected, the coolant appeared a cloudy gray to black in comparison to the freshly diluted material which was clear and amber in color. Samples contained considerable particulate matter, much of which would settle on standing. It was learned that the machines were cleaned only infrequently, at best at intervals of from four to five weeks. This was not in accord with the manufacturer's instructions calling for cleaning of the machines approximately every two weeks. Many operators also remarked that an unpleasant odor came from the coolant before the machines were started for the day's run; however, this was never observed by us.

We regret that we were not informed about the new coolant before it was put into use. The importance of having the medical department evaluate all new materials and processes for potential health hazards before they are introduced factory-wide cannot be over-emphasized. Many organizations now have committees, often called chemical safety committees, composed of representatives of the medical, engineering, purchasing, and safety departments, as well as the chemical and physical testing laboratories, who work together on this problem. In this regard, too, local and state bureaus of industrial hygiene, because of their experience, can be very helpful in evaluating new materials and processes, particularly for the smaller plant that usually does not have the facilities to do this type of work itself.

That there were no lost time or compensation cases, we attribute to the effective control rendered by the medical department especially in recognizing the need for permanent removal in one-third of the cases.

Summary

FIFTEEN cases of contact dermatitis, related to a new water soluble coolant and presumbaly allergic in nature, occurring in a machining industry, are presented. Both incidence and severity appear to be significantly greater than those for an insoluble cutting oil previously used on the same operations.

Management of cases and prevention are discussed. Emphasis is placed on the advisability of having all new materials and processes evaluated for their potential health hazards before being introduced into industry.

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ASSOCIATION NEWS

THE PRELIMINARY Program and Planning Committee for the 1950 Industrial Health Conference scheduled for Chicago April 22-28, 1950 at the Hotel Sherman, held its initial meeting August 10, 1949, with much basic groundwork having been accomplished. Excellent programs have been planned for all five participating groups. They include many presentations of original papers, recent advances in these fields and hospital clinics as well as plant visits throughout the Chicago area. Special arrangements are being made for the entertainment of the ever-increasing number of wives and guests who enjoy the fellowship of these meetings from year to year. Representing the participating groups at the committee meeting were: G. L. DUNDORE, H. BRUDER, E. B. BURGESON, H. BECK, D. ARMSTRONG, AMERICAN ASSOCIATION OF INDUSTRIAL NURSES; E. C. BARNES, A. D. BRANDT, W. COOK, H. T. WALWORTH, C. W. WYMAN, AMERICAN INDUSTRIAL HYGIENE ASSOCIATION; L. J. CRALLEY, K. M. MORSE, AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS; DR. and MRS. E. H. CARLETON, DR. H. G. GARDINER, S. G. HALOS, DR. and MRS. E. C. HOLMBLAD, DR. A. G. KAMMER, DR. A. K. PETERSON, DR. F. W. SLOBE, DR. A. H. WHITTAKER, AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS; DR. T. C. BROWNING, CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY; DR. C. DRUECK, CHICAGO SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY. Although it was not possible for the Industrial Dentists to have a representative present, a letter was read from this group indicating that they are planning three full days of meetings, conferences and field trips instead of their usual two day meeting. Remember the place and dates, Hotel Sherman, Chicago, April 22-28, 1950.

DR. CARL T. OLSON, Regional Medical Director of the Liberty Mutual Insurance Company, Chicago, and Chairman of the Workmen's Compensation Committee, AAIP & S, will speak at the Ohio State Industrial Safety Association meeting in Cleveland, September 22, 1949. His address is entitled, "Tailoring the Medical Program to Fit the Plant Needs." On June 14 Dr. Olson appeared on a panel on industrial medicine at Worcester, Massachusetts.

THE INDUSTRIAL Medical Association of the Province of Quebec is holding a three-day meeting in Quebec City at the Chateau Frontenac on September 29, 30 and October 1. The purpose of the meeting is to provide an opportunity for industrial physicians to convene to discuss problems related to industrial health supervision which are of common interest. Features of the program will be: clinical session covering "Injuries to the Hand," "Clinical Diagnosis of Head Injuries," "Skin Diseases in Industry," and "The Diabetic in Industry"; clinical session covering "Occupational Diseases of the Lungs," "Psychosomatic Ailments of Workers as seen by the Industrial Physician," "Psychosomatic Complaints of Industrial Workers as seen by the Consultant Psychiatrist," and "Rehabilitation after Injury"; panel discussion on "Seletcion and Training of Industrial Nurses"; symposium on "Scope of Industrial Health Supervision Services"; and addresses on "Alcoholism in Industry" and "Opportunities for Group Health Instruction in Industry."

Psychiatry and Dermatology

REPORT OF SECOND TRIMESTER FELLOWSHIP IN INDUSTRIAL MEDICINE AWARDED BY THE AMERICAN FOUNDATION OF OCCUPATIONAL HEALTH: For the past three months I have been dividing my time equally between dermatology and psychiatry. The training and instruction in dermatology were received by participating in a Fellowship program given to physicians interested in qualifying for certification by the American Board of Dermatology. This training was received at the dermatology clinics associated with the University of Pittsburgh. Lectures were attended once a week. The clinics were conducted so that it was possible to see each new patient who presented himself, and to follow him subsequently through his stages of treatment as often as he returned. As a new patient was presented, the history and physical findings were noted by the Fellow, and a diagnosis determined. Following this, the patient was seen by a dermatologist whereupon history, physical findings, diagnosis, differential diagnosis, and treatment were discussed with the Fellow, as well as with the group. Stress in these clinics was laid heavily on the more common diseases of the skin. Numerous cases of acne, pityriasis, scabies, dyshidrosis, epidermophytosis, neurodermatitis, contact dermatitis, pustular bacterids, and infectious eczematoid dermatitis were seen. In suspected cases of contact or industrial dermatitis, routinely the patient was patch tested after the acuteness of the lesions had subsided and a careful searching history had been obtained. This is of considerable importance in industrial practice. It would appear that the employee invariably blames his condition on the material he has been using without thought to the possibility of other causes. My psychiatry instruction was received at Western State Psychiatric Hospital. While there, on resident status, access was given to all the facilities and activities of the institution. The first month was devoted to lectures, ward rounds, attendance at and participation in screening conferences, and observation of various forms of therapy. The second month continued these activities with addition of attendance at group therapy and participation in the out-patient clinic. For the latter part of the second month and the entire third month, patients were assigned to me for therapy in the out-patient clinic. Those patients with industrial problems were, of course, of particular interest to me and, therefore, emphasis on this type of case was made. The complexities of present day life to a large part contribute to the upward trend of psychoneurosis. Modern industry as we know it has developed only in the past four to five decades and it is to be assumed that still greater expansion and development are still before us. In spite of our great advances and achievements in science and industry, modern society appears slowly to be coming apart at the seams. This in view of the fact that we have technical skills to provide sufficient commodities for the necessities of every man, woman and child and to provide better physical surroundings for them. Our deficiencies appear to lie in the inability to adapt ourselves to fast and continuous change and to a poor understanding of our industrial civilization. The industrial physician should be acutely aware of the importance of psychological and social

factors in the production of medical disorders. He should be extremely responsive to the needs and interests for which employees are seeking satisfaction in their industrial situations. To be able to realize this he must have knowledge as to how the employees think and live, how they adjust to one another, what gives them satisfaction and what leads to wide-spread disappointment. He must realize that psychogenic disorder may arise either from external causes or from conflicts that develop between the integral parts of the individual personality. We are concerned with external causes which include struggle for food, shelter and struggle in competition with others for financial security. The greater dependence of men on large corporations with their associated lay-offs, impersonal attitudes, lack of concern for the future of the worker may contribute to a feeling of insecurity. Industrial employees will seek satisfaction in wages, hours and future benefits, better working conditions, less dictatorial control and a sense of belonging. The thwarting of these needs and interests may give rise to social unrest and psychiatric disorders. However, if a person is happy at his work, well adjusted with his fellow workers and employers a greater sense of security may be obtained for there is a definite need to share the fortunes of an adequate group rather than to stand alone. Psychiatry teaches us that if an individual is made physically comfortable, if he is made happy and if he has a chance to express himself without too much unnecessary frustration he is fortunate indeed because he becomes the optimistic, hopeful individual who contributes to the world and those about him. The individual whose needs are not met when he comes into the world, who is neglected, and who lives in an environment that is indifferent and cold towards him, will develop hostility, resentment, hate, and pessimism, all of which makes it very difficult for him to function. This may apply equally as well to the industrial worker when he first comes into employment. The ordeal of the first job is similar to that of the first day of school. The person who is well adjusted has little difficulty being taken into the group, however, the poorly adjusted person, sensitive or suspicious develops anxiety due to restriction and rigidities of the job. If he stays on the job, upset stomachs, heart palpitation, colitis, or some other symptom may develop as an expression of his anxiety. —J. H. JOHNSTON, M.D.

DR. ANDREW M. HARVEY died the morning of July 18, 1949, in Long Beach, California. This news shocks us into a realization that one of the co-founders and signers of the original incorporation papers of the AAIP & S has passed on. All his life DR. HARVEY was not only keenly interested in this Association but attended its many meetings, and was the first medical director of a medical department in industry.

He was born in Galesburg, Illinois in 1868; received his B.S. degree at Knox College in 1889, M.S. in 1892; M.D. at the Chicago College of Physicians and Surgeons in 1893; and D.Sc. honorary degree in 1939. He interned at St. Elizabeth Hospital, Chicago. He was Medical Director of Crane Company, 1896-1937, and secretary of the section on Preventive and Industrial Medicine and Public Health of the American Medical Association. In addition to his active work as Medical Director and Chief Surgeon of the Crane Company, he had time for many other activities which gave to the community the value of his knowledge and experience. He was a member of the Board of Education of La Grange, Illinois; active in the National Safety Council and the first president of the Chicago Safety Council. He was vice-president of the Tuberculosis Institute of Chicago and Cook County, and active on the staffs of Frances Willard Hospital and Garfield Park Sanatorium.

Since he retired from medical directorship of the Crane Company he has resided at Long Beach, California and maintained his interest in health by serving as assistant health officer, and during World War II by rendering outstanding service in organizing the community for civilian defense.

His life has been a rich and fruitful one. We cherish the memories of his pleasant interest and helpful personality as he met with us at the Association meetings.

DR. THEODORE LE ROY STORY, AAIP&S member since 1934, Fellow since 1941, and a Director 1934-44, died at his home in Southbridge, Massachusetts on August 9, 1949. DR. STORY was born on June 24, 1888, graduated M.D. cum laude from the Tufts College Medical School in 1917 and was associated with the United States Public Health Service from 1919-22. He was assistant to the Surgical Director, Travelers Insurance Company from 1922-25, and was engaged in private practice in Holden, Massachusetts until 1926, when he affiliated with the American Optical Company, Southbridge, and served as Medical Director until his death. DR. STORY was the author of "Is There a Doctor in the House?" INDUSTRIAL MEDICINE, March, 1940. He was a 1st lieutenant in the Medical Corps of the U. S. Army during World War I and thereafter was active in civic, church and social affairs. The loss of this fine gentleman from our ranks will be felt for many years to come.

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Belaboring the Point

WE ARE again confronted by two similar bills in the House of Representatives and the Senate, which are almost the same as they have been in previous presentations. H.R. 4997 and S. 1992 read as follows: "To create in the Department of Labor a Bureau of Accident Prevention for the purpose of promoting and maintaining safe and healthful conditions of employment in hazardous industries affecting commerce, and for other purposes."

The above wording may well be compared with H.R. 475 of the 1947 vintage, in which it affirms specifically that *one of its purposes* is to enable the Department of Labor "to cooperate with state agencies administering labor laws in establishing and maintaining safe and proper working conditions in industry and *in the preparation, promulgation, and enforcement of regulations to control industrial health hazards.*" And the amounts allotted to the states from the five million appropriation are, as before, to be based in part on *"the special safety and health problems in industry"*—all this with a view "to encouraging more effective control of hazardous conditions." (Taken from an editorial in the April, 1947, issue of INDUSTRIAL MEDICINE, page 185.)

It might be well here again to quote the editorial noted above: "The bills are alike in that they are the same old perennials watered down as the result of committee hearings in previous Congresses so as to 'get by' this one. They are enough different to suggest that the difference was planned to involve a compromise 'in conference' after their passage that will fasten down the lid of their name without disturbing the contents of their hidden 'innerds' of purpose. The name is 'safety'; S. 101 states that it may be cited 'as the Industrial Safety Act.' Both bills *seem* to have 'safety' as their chief objective. But . . . ."

It is of interest to note that the Industrial Hygiene Committee of the Association of State and Territorial Health Officers has made a brief analysis of these bills and has in part, spoken as follows:

"These are bad bills and should not be passed because health activities would be included under the labor department.

"They give authority to the Federal Department of Labor to undertake the industrial hygiene activities now being done by the U.S. Public Health Service and the health authorities throughout the country. They propose to create a 'Bureau of Accident Prevention' in the Federal Department of Labor 'for the purpose of maintaining safe and *healthful* conditions of employment in hazardous industries.' The director would be an individual equipped with technical education or practical experience in the field of *health* and safety engineering.

"The bill would place in the Federal Labor Department the industrial health activities now being carried out by the U. S. Public Health Service and state departments of health.

"The director's duty would be to conduct inquiries and technical investigations into conditions of employment in hazardous industries with a view to improving the *health*, safety and *general well-being* of employees—to develop reasonable standards of operation for the protection of *health*, safety and *general well-being* of employees in hazardous industries for the prevention and correction of industrial hazards to *health* and safety of such employees.

"The Secretary of Labor is authorized to appoint the members of an 'Accident Prevention Board' for *each* hazardous industry. Each board *shall make and modify rules and regulations* for the elimination of unsafe and *unhealthful* conditions including the prevention of accidents and *occupational diseases* for the hazardous industry for which it is appointed. The boards shall consider the causes of accidents and *industrial and occupational diseases.*

"The bill gives any designated officer of the Federal Department of Labor the right to enter and to inspect premises, question employees, inspect records and investigate facts, conditions and practices.

"It is declared unlawful for any person to fail to comply with the rules and regulations developed and promulgated by the various boards and provides a fine for violation of not more than $1,000 and not more than six months in jail, or both.

"This bill wraps up in one neat package factory inspection, accident prevention, *industrial health* and the development, promulgation and enforcement of codes, rules and regulations and places it in the lap of the Secretary of Labor to administer as he sees fit without consulting any of the state agencies concerned.

"Industrial health activities, including the prevention of occupational diseases, should be left with the Federal, state and municipal health authorities."

This analysis pretty clearly delineates that there is no mistaking the intent of these bills which provide specifically for Department of Labor control of all industrial health and safety activities in American industry.

A FURTHER comment by the Industrial Hygiene Committee of the Association of State and Territorial Health Officers is something which is ordinarily known, but may bear repetition here—There are industrial hygiene bureaus in 44 state departments of health and, in addition, several in departments of health in the larger cities, counties, and several of the territories—about 56 in all. More than 400 specifically trained doctors, nurses, engineers, and chemists are employed, and about two and a half millions dollars are being spent. The legislators in these states have provided funds for industrial hygiene work in state departments of health. Moreover, the U.S. Public Health Service has a splendidly equipped laboratory for industrial hygiene purposes and a personnel of approximately 125 technical individuals engaged in research and field work in industrial hygiene. In addition to research, special studies and surveys, they are also engaged in training technical personnel for the various state units. This work by Federal and state health agencies is a public health activity inextricably woven into other health activities of the Public Health Service. It is significant that the U.S. Public Health Service has been engaged in this work for almost half a century.

AND now, if we may add the same things that we have previously said in editorials which have been published in these columns:

"1. Industrial hygiene is a health matter, not a labor matter.

"2. Industrial hygiene activities are now being handled, *and excellently handled,* by the Federal and state public health officers, through their Divisions of Industrial Hygiene, and their sanitary, engineering, laboratory, nutrition, and other public health facilities.

'3. The present effort to extend the scope of the Labor Department's authority to the control of industrial health hazards and to 'special safety and health problems in industry,' insofar as health and health hazards are concerned, disregards the obvious fact that *such extension would duplicate existing facilities.* This duplication is completely unnecessary—so patently unnecessary as to label the efforts to bring it about bureaucratic and political in the worst sense in which these terms are critically employed, to say nothing of the fact that the proposal involves a wholly needless expenditure of taxpayers' money. (This last phrase means a great deal more today than it did in April, 1947, when it was written.)

"4. Health departments have the ability to carry on health and hygiene services *impartially.* This is inherent in their professional status, for this status not only demands the ability but also imposes the duty to be impartial. No physician, no engineer, will risk his reputation by being anything but impartial. This, however, cannot be said of those whose tenure of position depends upon the good will of pressure groups; the official careers of such are mosaics of carefully-graded preferences and partialities." (This in the light of recent events, also has apparently more significance than when it was written in April, 1947.)

For those who wish further documentary evidence, there is a discussion of H.R. 4997 in the Congressional Record, Vol. 95, No. 99, pages 7439 to 7454, which especially should be read by those charged with administration policies of industrial health.

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MANY INSURANCE carriers are complaining that they have great difficulty in locating physicians because of the illegibility of their signatures. As all reports should be signed by the doctor a rubber stamp or typewritten name should be added, to be sure the doctor can be properly identified and located.

—*Westminster Medical Bulletin*, August, 1949.

Health Service Costs

WITHOUT Marshall Plan aid Britain could not afford the wholesale benefits of its new National Health Service. This year the scheme will cost nearly $1,500,000,000 or more than 10% of the country's entire national budget. When in full operation it will probably cost about $2,500,000,000 a year. At the same rate a socialized scheme here would cost about ten billion dollars a year, though higher American price levels would probably push it well above that figure.

—WILLIAM ALAN RICHARDSON, editor, *Medical Economics* in *Ohio State Medical Journal*, August, 1949.

Tuberculosis

TUBERCULOSIS is on its way out, says a TB report, and much credit for the achievement goes to industry—both labor and management. The report is based on a panel discussion on tuberculosis in industry held in connection with the 13th annual meeting of the Industrial Hygiene Foundation at Mellon Institute. Industry's biggest role has been the instituting of various insurance and workmen's health plans, the report declares. A big part has also been played by unions' benefit programs.

—*Zanesville, Ohio, Times-Signal*, July 3, 1949.

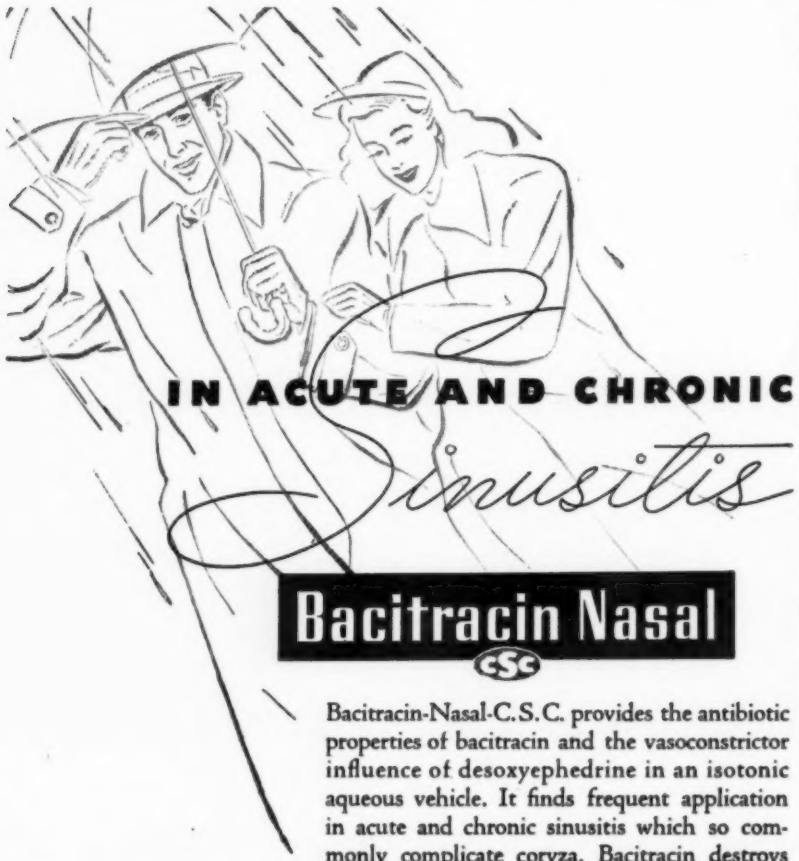
Standing Orders

INFORMAL discussions have convinced us that the desire for standing orders expressed on the part of the nurses' organizations is prompted by a wish to have effective medical supervision which will justify them in procedures which are commonly accepted as good practice throughout the United States in industry, and that the endorsement of these limited practices will—both by implication, and in fact—conversely discourage the medical liberties taken, whether in industrial establishments, or in institutions, or in private offices by those nurses or lay attendants who neither desire nor seek any reasonable limitations in their activities.

—From the report of the "Committee on Industrial Health," C.M.A., in *California Med.*, April, 1949.

Benefits of Nationalization

THE current *Atlantic Monthly* (August, 1949) notes that the French National Railroads, which are the largest single industry in France, "employ 457,000 workers and must in addition support 325,000 ex-railway men on pension." Technical improve-



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ments in equipment since 1938 have made possible a reduction of 37% in working forces, but during the same period there has been an increase of 27% in administrative personnel. The French railways are nationalized. The 1947 total for salaries and pensions was 101 billion francs; the total for all other expenses was 41 billion francs. The retirement age is 50 for the active worker, 55 for the office worker.

Group Identification

IN THE industrial environment, there are many parallels. A worker who has injured his finger may be reluctant to visit the plant dispensary because he fears that his co-workers will consider him a sissy. Health education can change that attitude. A reverse situation can be created, whereby the worker finds himself propelled to the medical department by employee pressure to prevent a serious infection. When a whole group has been indoctrinated in the importance of certain health principles and precautions, a desire for group identification further motivates the individual member to do what is expected of him.

—From "Where Health Education and Health Services Merge," by TULA SALPAS, USPHS, *Industrial Hygiene Newsletter*, August, 1949.

Education

IN RECENT years our medical schools have taken cognizance of the importance of industrial medicine, and many of them have established post-graduate courses in industrial medicine. Because of its increasing importance it should, however, have its place in the undergraduate curriculum. At the present time the American Medical Association is giving favorable consideration to recognition of industrial medicine as a specialty equal to surgery, internal medicine, neurology, etc. To this end fellowships and residencies in industrial medicine are being established. The AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS has sponsored such a fellowship at the University of Pittsburgh, and General Motors Corporation has established several in-plant residencies for training.

—From the report of the "Committee on Industrial Health," Massachusetts Medical Society, in *New England J. Med.*, July 21, 1949.

Industrial Nurses

WHEN I joined the American Brake Shoe Company 38 years ago, office talk about doctors and medicine had only to do with the sickness of a member of the family or some friend. I am sure no one in our headquarters ever mentioned industrial hygiene. As for nurses in industry, I am not sure I even knew there were any except in extremely dangerous industries where adequate first aid facilities were essential... Today we have a medical department, and its director is recognized as a most important member of our management. He has a strong staff. Today, a look at our departmental expenses quickly proves industrial nurses are accepted as essential .... The industrial nurse is the best contact we have with the

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—From an address by WILLIAM B. GIVEN, JR., *American Journal of Nursing*, August, 1949.

Industrial Nursing Section

THREE sessions of the National Safety Council's industrial nursing section are scheduled for the 37th National Safety Congress, to be held in Chicago, October 24-28. The first meeting on October 24 will feature a talk on developing the .opportunity for tuberculosis case finding in industry by DR. EDWIN R. LEVINE, director of chest service, Michael Reese hospital. MRS. HELEN ELROD, R N., assistant executive secretary of the American Nurses Association, will discuss new challenges for the industrial nurse. A luncheon to honor past general chairmen of the industrial nursing section on October 25, DR. J. L. ROSENSTEIN, consulting psychologist and associate professor in the college of commerce of Loyola University, will be the featured speaker. A panel discussion on employee counseling will be held at the same meeting, under the leadership of RUSSELL L. MOBERLY, director of the University of Wisconsin's industrial management institute. Participants will be MISS ELEANOR BURTON, chief of the personnel counseling section, Western Electric Co., Inc., Chicago; MISS JOANNA M. JOHNSON, R N., director of the industrial nursing division, engineering department, Employers Mutuals of Wisconsin, Milwaukee, and DR. DAVID SLIGHT, superintendent of the Veterans Rehabilitation Center, Chicago. The third meeting on October 27 will be highlighted by a talk on safety and industrial medicine by DR. C. F. SHOOK, Medical Director, Owens-Illinois Glass Co., Toledo; and DR. EDWARD C. HOLMBLAD, of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, will speak on some interesting experiences in industrial nursing problems. All industrial nursing sessions will be held in the Congress hotel, and a discussion period will follow each speech. MRS. JOAN TIMKE, R.N., general chairman of the industrial nursing section of the National Safety Council, will preside at all sessions.

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years, is attacked from a new and realistic angle in a series of articles running in several Midwest employee publications and at least one local union paper. Rare example of a syndicated series with enough appeal to sell to the house-organ press, the stories are written with unusual understanding—both from the point of view of the alcoholic and from that of management, which does not want to lose good men. But they are not sermons or tracts. Instead of being aimed at the chronic alcoholic himself, they are written to the friend, relative, or boss. They tell how to recognize the alcoholic who is a "sick person," as distinguished from other kinds of drinkers; what to say to him and do for him; how to set him on the path to rehabilitation. Series has appeared in *Honeywell UE News* of Local 1145, United Electrical Radio & Machinery Workers (CIO), Minneapolis, as well as in company employee papers. Relying heavily on the findings of Yale University's Laboratory of Applied Physiology, the methods of the Yale Plan Clinic for Alcoholics, and the program of the National Committee for Education on Alcoholism, the articles are available from John R. Neal, 1014 Linwood Ave., St. Paul, Minn.

—*Modern Industry*, July 15, 1949.

Lip Cancer

SENSITIVITY to cancer of the lip, regardless of sunlight factors, may be determined by the color of eyes and hair, as well as complexion," according to LIEUTENANT COLONEL JOSEPH L. BERNIER, Chief, Dental and Oral Pathology Section, Armed Forces Institute of Pathology, in a paper read before the Dental Faculty of the Royal College of Surgeons in London, England. COLONEL BERNIER, recently elected to a Fellowship in Dental Surgery in the Royal College of Surgeons, has for over two and a half years been conducting a study on World War II soldiers with cancer of the lip, in conjunction with MRS. M. L. CLARK, Chief Statistician at the Institute. He had revealed earlier this year that of 528 lip cancers among white soldiers, the majority of patients were of fair or ruddy complexion. In his paper, "Carcinoma of the Lip—An Analysis of 835 Cases," he said that supplemental research has disclosed that: (1) Blue or grey eyes, blonde or brown hair, and fair or ruddy complexion were found in the majority of more than 500 World War II soldiers with cancer of the lip. These combinations held regardless of the geographic regions in which the soldiers had lived, although 72% were born south of the 40° parallel, where the incidence of skin cancers is unusually high. (2) These findings, together with the extremely low percentage of lip cancer in Negro soldiers (who have abundant pigmentation and thickness of skin) indicates that

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an absence of protective pigment and thinness of skin may be influencing factors in persons subjected to prolonged sunlight. (3) Approximately 90% of both "indoor" and "outdoor" workers had fair or ruddy complexions. Since former indoor workers had periods of relatively long exposure to sunlight during Army service, it is possible that the "sunburn" wavelengths of solar radiation (3200 Angstrom units or less) are a factor in developing lip cancer in persons who lack sufficient protective pigmentation or whose outer skin covering is thin. (4) Seventy-six per cent of the soldiers served for six months or longer in United States areas which received 60 to 85% of the possible annual sunshine, and 62% served in tropical or subtropical areas for at least six months. (5) Of 375 patients who were followed after treatment, 343 were living and free from cancer at the end of three years, making a three-year cure rate of 91.5%. The cure rate for five years was 82.1%. (6) Approximately 83% of the surgical and biopsy specimens showed changes in the skin and/or mucous membrane of the lip, which are usually associated with age changes in normal skin and mucous membrane. Although the survey is not yet completed, an important observation seems to be that lip cancer is usually of low-grade malignancy and most often occurs in tissue in which the degenerative changes of age are seen. COLONEL BERNIER also stated that although heredity may appear as an important factor in the occurrence of lip cancer, this is apparently centered about the absence or presence of protective pigmentation and the thinness of the skin.

—Department of the Army, Office of the Surgeon General.

Poor Vision Costly

EYE ACCIDENTS in American industry occur at the rate of two a minute throughout the working day, of which 98% could be prevented by adherence to well-established safety rules, according to the American Optometric Association. Preventable eye accidents cost 20 million dollars in 1948, with accident compensation claims and time loss the major elements of the cost. It was further stated that inefficient vision has been found to be responsible for one-fourth of all accidents in industry. The elements of good vision for a job were cited as follows: (1) Near acuity—ability to focus and see well with both eyes and each eye separately at a distance of about 15 inches. This is the distance at which most factory and office work is done; (2) Distant acuity—the same as above for a distance of twenty feet or more. This is necessary to adapt yourself to the environment around you; (3) Adequate field of vision—ability to see both sides and up and down, while focusing on a small target. This saves unnecessary eye and head movements and protects your safety: (4) Depth perception—ability to judge space relationships. This is important for accuracy in almost any job and essential to safety around dangerous ma-

chinery; (5) Binocular coordination—ability to make the two eyes work well together like a good team of horses. Without this, vision is likely to be inaccurate.

—*Beverly, N. J., Banner,* July 22, 1949.

WHO Commission

SEVEN INTERNATIONAL experts on venereal disease are conducting a six-week study of United States control centers, to provide the first international evaluation of American methods of venereal disease control, currently based on rapid treatment with penicillin, which has been developed primarily in the United States. Sponsored by the World Health Organization, the group is known as the WHO Syphilis Study Commission and is undertaking the tour of the U.S. under the auspices of the Public Health Service, Federal Security Agency. Members of the Commission are: DR. JUAN M. FUNES, Director, Rapid Treatment Center, Guatemala City, Guatemala; DR. E. I. GRIN, Director, Zemaljski, kozno-vener, dispanzar, Ministry of Health, Sarajevo, Yugoslavia; DR. N. JUNGALWALLA, Venereal Disease Adviser to Government of India; DR. POUL V. MARCUSSEN, Director, Municipal Venereal Disease Clinic, Copenhagen, Denmark; DR. I. HARASZTI, Chief, Venereal Disease Section, State Institute of Hygiene, Budapest, Hungary; DR. SIDNEY LAIRD, Adviser in Venerealogy, Suffolk, England; PROF. PIERRE JOULIA, Professor of Skin Diseases and Syphilis, Bordeau University, Bordeau, France; and DR. P. J. PESARE, Medical Officer in Charge of Venereal Disease Education, Public Health Service, Federal Security Agency, will serve as medical secretary to the Commission. DR. LEONARD A. SCHEELE, Surgeon General of the Public Health Service, recalled the work of a similar Commission appointed over 20 years ago by the League of Nations Health Organization to study malaria control methods. The report of the League's Commission was of great value in developing techniques for malaria control.

—Federal Security Agency, U.S. Public Health Service.

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(1 Freed, J.A.M.A., Feb. 8, 1947)

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Pacific Industrial Conferences

TENTATIVE programming of the many events at this year's Pacific Chemical Exposition and Industrial Conferences, to be held in San Francisco's Civic Auditorium November 1-5, are now complete, according to MARCUS W. HINSON, Exposition Manager. Highlights of the five-day industrial chemical gathering, taken from the detailed program soon to be issued, are: talks and panel discussions under 11 separate scientific groupings; more than 100 commercial exhibits in addition to a group of special exhibits; and continuous industrial motion pictures. Opening the Pacific Industrial Conferences which will run concurrently with the Exposition, will be a symposium on November 1 on "Regional Requirements for Chemicals" under auspices of the Western Chemical Market Research Group. The symposium will be followed by an afternoon conference and panel discussion on "Export Markets for Western Chemicals" led by the World Trade Section of the San Francisco Chamber of Commerce. The

remaining groups under which separate panel discussions will be held for the balance of the week are as follows: Petroleum Division, American Chemical Society (California Section), and American Institute of Mining Engineers; American Institute of Chemical Engineers (Northern California Section); Northern California Instrument Association; Pacific Insecticide Institute; Protective Coatings Group; Agricultural and Food Chemistry Division, American Chemical Society (California Section); Forest Products Research Society (Northern California Section); Northern California Rubber Group and Society of the Plastics Industry (San Francisco Section); and Pacific Association of Chemistry Teachers. Some of the many subjects to be covered in these group meetings are: "Review of Current World Chemical Developments"; "Processing Imports by the Western Chemical Industry"; "The Future of Energy Sources in the Western States"; "Desirable Personal Characteristics for Technical Personnel"; "History of Chemical Engineering as a Profession"; "Industrial Applications of Radioactivity"; "Agricultural Chemicals—a Ten Year Review"; "The Electroplating Industry on the West Coast"; "Engineering of Rubber Products for Industrial Needs"; "How Can Colleges and Industry Cooperate to Produce Better Chemists?" Commercial exhibits will be installed and manned by well over a hundred industrial companies from all parts of the nation. Designed to bring out the latest in chemical developments and discoveries affecting virtually all of industry, these exhibits will include all types of chemicals, raw materials, laboratory equipment, control and testing instruments, and processing. handling packaging and allied equipment.

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Workers' Health

DURING the past year your Committee on Industrial Health has been mindful of the increasing importance of the study of illness among industrial workers and its implications in the revolutionary changes in medical practice contemplated by certain governmental agencies. We call to your attention that there has been an increasing emphasis on the presumption that the health of the employee is a major responsibility of his employer regardless of the cause of illness or disability. Greater demands are being placed on management to maintain medical and hospital benefits. sickness and accident insurance and welfare funds as an answer to the health needs of the worker. There is a tendency for this type of coverage with scheduled and limited benefits to extend to families and dependents of workers. This protection is frequently purchased at a minimum cost by payroll deductions and cancels out with unemployment. With variables in the stability of our industrial economy this

type of protection affords a false sense of security. Employee-relations departments of industry are giving greater concern to the health problems of their workers—one large national employer has recently shifted the handling of personnel problems of his workers to the Medical Department. This widening field of industrial health responsibility places on the physician in industry the need of specialized training in administrative function as well as a sound medical and surgical education. Your committee has participated with interest and frequently with action in the development of publicity on health among industrial workers—particularly on radio programs. There is definite need in Illinois for a Division of Industrial Hygiene maintained as a fact-finding agency from which physicians, workers, employers, governmental agencies or any interested party may obtain unprejudiced and scientific assistance on problems affecting the relationship of illness to working environment. This need in the field of occupational medicine is almost entirely a health adjusting facility and the responsibility for its effectiveness should rest with the medical profession of our state.

—From the report of the "Committee on Industrial Health," Illinois State Medical Society, in *Illinois Med. J.*, July, 1949.

External Cod Liver Oil Therapy
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Fatty acids and vitamins are in proper ratio, thereby producing optimum results. Non irritant, acts as an antiphlogistic, allays pain, stimulates granulation, favors epithelization. Under Desitin dressing, necrotic tissue is quickly cast off. Dressing does not adhere to the wound. In tubes 1 oz., 2 oz., 4 oz., and 1 lb. jars.
Desitin Medicinal Dusting Powder is superfatted with crude cod liver oil in a non irritating powder base. Indications: In infant care in the treatment of IRRITATED SKIN, SUPERFICIAL WOUNDS, DECUBITUS, INTERTRIGO, PRURTUS and URTICARIA, in 2 oz. Shaker-Top Cans.
Professional Samples on Request
For the Medical Profession
DESITIN
CHEMICAL COMPANY

DR. PILGRIM

NOW CONCERNED with inspections relating to different kinds of problems and also at the desk writing reports, dealing with divers investigations .... AND sitting with DR. HOLMBLAD, KENNETH MORSE and MISS ZIANO, also DR. CHARLES ANROD, MISS E. ANGLUM, and MISS C. DENNING, discussing the course content of three courses on industrial nursing to be given at School of Nursing, Loyola University .... AND then concerned with matters of editorial implications and with manuscripts and pages .... AND in going through the mail recently, coming across a rather unusual insurance policy arrangement, namely for the coverage of infantile paralysis—the first of this kind encountered by PILGRIM —which provides for all expenses up to $5000 for each individual, the cost being $5.00 for two years for one person, and $10.00 for two years for an entire family—this indeed being an advanced idea in sickness insurance and especially noteworthy in the presence of the prevailing nationwide epidemic .... AND then going to the GARDINERS (after looking over some 1946 pictures of the Bohemian Grove Encampment and arranging them in proper order with groups of camp members) for afternoon and evening where there was much piano music and enjoyment of viands, later with porch conversation—all very enjoyable. . . . AND driving back home having some trouble with the cooling system, thereby developing a boiling radiator, so making stops at two points on the way and as it happened, being helped both times by an obliging Negro and so reminded of Kip-

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DAILY REMINDERS

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ling's lines "The Colonel's lady and Julia O'Grady are sisters under the skin" . . . . meanwhile hearing the CBS Symphony play excerpts from Tschaikowsky's opera "Eugen Onegin," in which portions were beautifully sung by Maria Kurenko . . . . AND now in reading, running across a quotation which seemed especially apropos at this time, coming from *The Harsh Voice* by Rebecca West: "There is no such thing as conversation. It is an illusion. There are intersecting monologues, that is all" . . . . AND again at the desk with much dictation of various types of reports and on the telephone with long distance conversations with respect to many problems involving medicolegal aspects . . . . AND there now being an opportunity to review the various ramifications of the problem of hernia in industry and finding that there are some industrial groups which are now disturbed about the increase in the incidence of hernia, albeit that they are employing older men and that the general population itself is showing increased figures in the older age groupings . . . . AND between times, having time to read some of the later mysteries and finding that they are at present (at least) improving somewhat in plot and characterizations . . . AND also viewing the yacht races on Lake Michigan on several successive days . . . . AND hearing Artur Rubenstein playing superbly in the last movement of the Rachmaninoff Second Concerto, after visiting the ballground and helping keep score in various playoff games . . . . AND reading interim letters from Ramazzinians LEGGO and JOHNSTONE, in which there was developed the theme of the trend of industrial medicine especially with regard to its sociological aspects with comments as follows: "In this connection, most

of us have seen industrial medicine grow from a purely compensation service into a fairly well rounded health program. We have seen the rehabilitation aspects emphasized and clarified. We have seen psychiatric programs explored and some planted to stay for further modifying and stabilizing. May I invite your interest in the timeliness of developing the sociological aspects of industrial medicine? The scientific study of American sociology is relatively new. We have all shared the developing of the industrial physician from the 'finger wrapper' who saw the lesion to the broader physician who has seen the patient as a whole individual in his industrial environment and his industrial stresses and strains. Is it not reasonable to assume that our next development will be an exploration of his 118 hours of social background, as compared with his 40 hours of work a week? Some contributions have been made by those in public health, but they have been limited greatly to the health facet. It is the sum total of health, economics, political beliefs, religious beliefs, living conditions, and education, which makes the employee behave and feel as he does. And I anticipate that the next generation will seek what the sociologist has to offer in explaining what, in the bundle we have been carrying, is causing the rattle" .... AND with reference to this group of statements, it was advised that one should read "The Governing of Man" by Alexander Leighton, published by the Princeton University Press.... AND now planning for several plant visits in different States including Illinois, Pennsylvania and Ohio, where there are to be later on some routine studies in dust determinations; meanwhile hearing the Lewisohn Concert, Pierre Monteaux conducting Beethoven's Fifth, the Concerto in A Major by Liszt, the symphonic variations for piano and orchestra by Cesar Franck, so well played by Leon Fleischer, guest pianist .... AND concerned with reading and reporting on a series of x-ray films of a group of employees in which there is considerable interest and comparing such findings with results of an extensive dust survey made by one of the official agencies.... AND finding that only one of such x-ray cases proved positive, in the face of negative findings with respect to dust—suggesting that conditions had of course been improved after some years of elapsed time.... AND now driving leisurely to Wildwood and again visiting the XAVIERS after a long interval and enjoying a walk through the neighboring woods, food and drink, and a canine welcome of the first order by Boris, whom we had dubbed "the Mark Twain of Dogdom". . . . AND now reviewing the files of some cases with respect to the taking of depositions, containing both dust exposures and medical data .... AND later on, sitting with DRS. ERNEST BROWN, CARL PETERSON, MILTON KRONENBERG, and Engineer KENNETH MORSE, with respect to plans for educational seminars for general practitioners and industrial physicians .... AND again later, on the same subject, at lunch with DEAN YOUMANS and DR. KLEINSCHMIDT and also DRS. SLOBE and BROWN, particularly with reference to working out the details for an industrial health seminar to be sponsored by various agencies.... AND now preparing for the advent of friends from California, for a very brief stopover enroute to New York and Europe, of which more in later notes.

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report these facts about Athlete's Foot:

[*From ARCHIVES OF DERMATOLOGY & SYPHILOLOGY, April 1942, pp. 670-675*]

1. Athlete's Foot develops not from exposure to new germs but from lowering of resistance to the germs almost always carried on the feet.
2. The use of germicides and disinfectants to prevent Athlete's Foot is potentially harmful and may lead to all kinds of irritations and aggravations of existing lesions of the skin and even to production of allergic and other dermatoses.
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DR. FRANCIS LIZARDO VIDAL, staff physician of the Dr. Martos Sanitorium, Cuidad Trujillo, Dominican Republic, has invented a new type of pneumothorax apparatus for use in the treatment of pulmonary tuberculosis, according to Dominican Republic Information Center. Simpler in construction than devices in standard use, the new apparatus has a greater capacity for injection and aspiration, is easier to use and more economical to manufacture. It is also described as more attractive in appearance. The Lazardo Vidal machine is constructed on a framework of plexiglass. It is of the movable ampulla type, having a simple mechanism to initiate treatment. A gauge registers intrapleural pressures up to 25 centimeters, plus or minus, insuring against the possibility of injecting air into the bloodstream and the formation of air embolisms. Air is double filtered. Two joined graduated bulbs with a capacity of 500 c.c., forming a communicating system, slide up and down alternately by means of a special mechanism —injecting or withdrawing air or fluid, according to the requirements of the patient. Fully tested at the Dr. Martos Sanitorium, the new apparatus has been widely accepted by specialists in pulmonary tuberculosis in Ciudad Trujillo. DR. LIZARDO VIDAL is a native Dominican. He was graduated from the Medical College of the University of Santo Domingo in 1945. Further information regarding the apparatus may be obtained by writing DR. VIDAL at the Dr. Martos Sanitorium, Cuidad Trujillo, or by contacting the Dominican Republic Information Center, 6 West 51st Street, New York, New York.

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[1]Art of Egypt Through The Ages, by Sir E. Denison Ross

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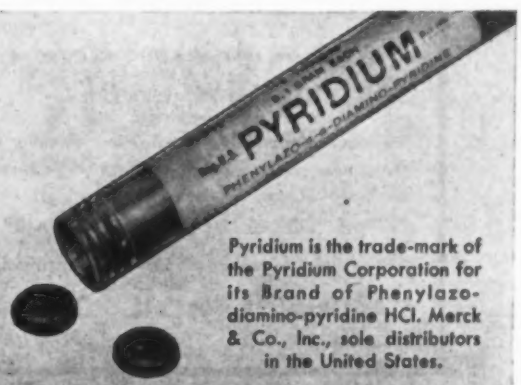

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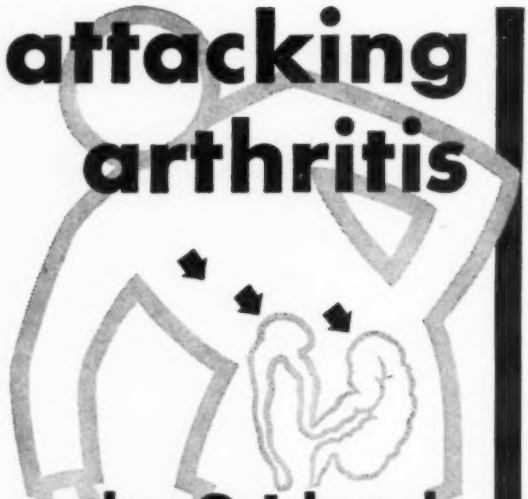

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*Nuzum, F. R.: In Diseases of the Digestive System, ed. by S. A. Portis, Lea & Febiger, 1944.

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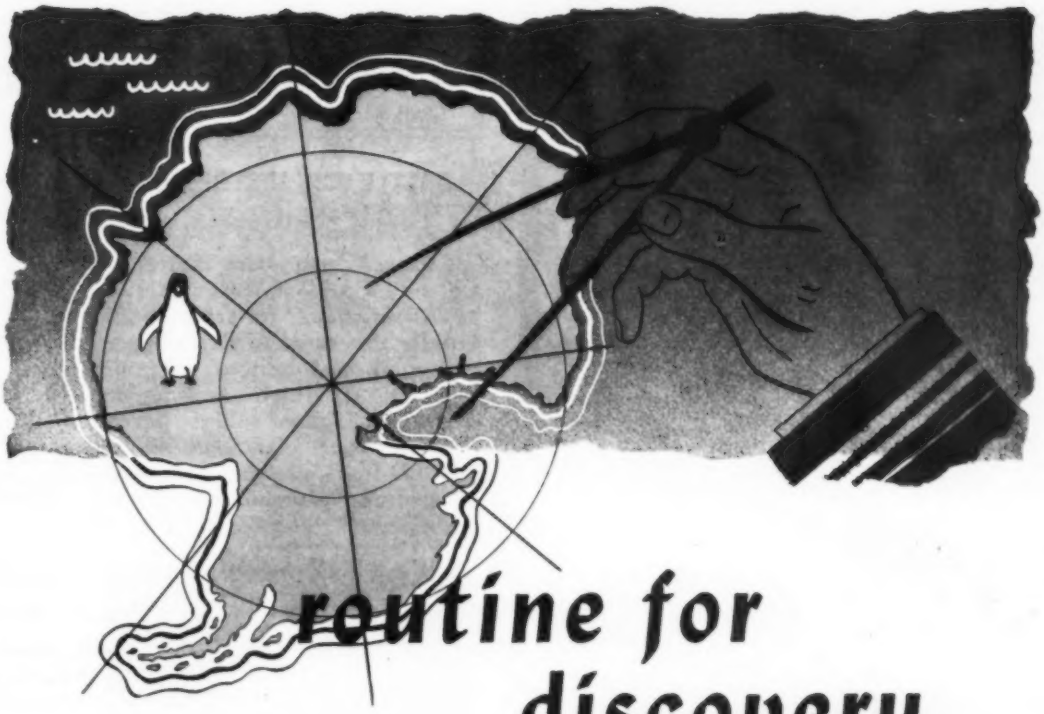

routine for discovery

The national total of undiagnosed or "unknown" diabetics may run from a million to two or even three.[1,2] Modern treatment, when promptly initiated, can do much to prevent metabolic decompensation and to minimize diabetic complications. Therefore, the clinical revealment of diabetes mellitus at an early stage is essential.

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(1) Joslin, E. P.: Postgraduate Med. 4:302 (Oct.) 1948. (2) Kemper, C. F.: Rocky Mountain M. J. 45:1092 (Dec.) 1948. (3) Pollack, H.: New York Med. 4:15 (Dec. 5) 1948.

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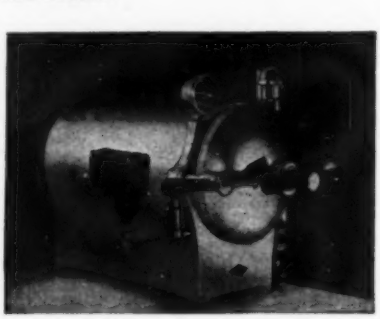

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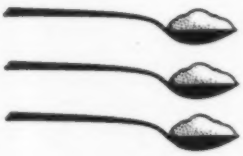

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1. Grimson, Marzoni, Reardon and Hendrix: Ann. of Surg., 127: 5, May, 1948.
2. Reich, N. E.: Med. Times, Jan., 1949.

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